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POLLUTION OF LAKE MICHIGAN AND ITS TRIBUTARY BASIN. PROCEEDINGS OF CONFERENCE, SESSION (3rd) (RECONVENED), HELD AT CHICAGO, ILLINOIS, ON MARCH 24-25, 1971. VOLUME 3

Environmental Protection Agency
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PROCEEDINGS

Third Session
(Reconvened)
March 24, 25, 1971
Chicago, Illinois
Volume 3

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CONFERENCE

In the Matter of Pollution of Lake Michigan and its Tributary Basin

ENVIRONMENTAL PROTECTION AGENCY • WATER QUALITY OFFICE

37k

RECONVENING OF THE THIRD SESSION OF THE CONFERENCE IN THE MATTER OF POLLUTION OF LAKE MICHIGAN AND ITS TRIBUTARY BASIN IN THE STATES OF WISCONSIN, ILLINOIS, INDIANA, AND MICHIGAN - VOLUME III

Randolph Room
Sherman House
Chicago, Illinois
March 25, 1971

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The report is on the

Reconvening of the Third Session of the Conference in the Matter of Pollution of Lake Michigan and Its Tributary Basin, in the States of Wisconsin, Illinois, Indiana, and Michigan, held in the Randolf Room of the Sherman House, Chicago, Illinois, on Thursday, March 25, 1971, at 9:00 a.m.

It includes statements, [illegible], and recommendations on [illegible] waters, [illegible] water, [illegible] waste discharges and [illegible] information

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PRESIDING:

Murray Stein, Assistant Commissioner for Enforcement and Standards Compliance, Water Quality Office, U.S. Environmental Protection Agency, Washington, D.C.

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CONFEREES:

RALPH W. PURDY, Executive Secretary, Michigan Water Resources Commission, Lansing, Michigan.

PERRY E. MILLER, Assistant Director, Stream Pollution Control Board, Indiana State Board of Health, Indianapolis, Indiana.

FRANCIS T. MAYO, Regional Director, Water Quality Office, U.S. Environmental Protection Agency, Region V, Chicago, Illinois.

DAVID P. CURRIE, Chairman, Illinois Pollution Control Board, Chicago, Illinois.

CONFEREES, Continued

THOMAS G. FRANGOS, Administrator, Division of Environmental Protection, Wisconsin Department of Natural Resources, Madison, Wisconsin.

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ALTERNATE CONFEREES:

CARLOS FETTEROLF, Water Quality Standards Appraisal, Michigan Water Resources Commission, Lansing, Michigan.

ORAL H. HERT, Director, Division of Water Pollution Control, Indianapolis, Indiana.

DALE S. BRYSON, Deputy Director, Office of Regulatory Programs, Water Quality Office, U.S. Environmental Protection Agency, Region V, Chicago, Illinois.

JACOB D. DUMELLE, Member, Illinois Pollution Control Board, Chicago, Illinois.

DONALD J. MACKIE, Assistant Secretary, Division of Environmental Protection, Wisconsin Department of Natural Resources, Madison, Wisconsin.

CARL T. BLOMGREN, Environmental Control Engineer, Illinois Environmental Protection Agency, Springfield, Illinois.

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PARTICIPANTS:

James B. Henry, Vice-President and General Counsel of American Electric Power Service Corporation, New York City, New York.

Evan James, Vice-President, Power Generation and Engineering, Wisconsin Public Service Corporation, Green Bay, Wisconsin.

J. A. Pelletier, Vice-President, Engineering and Electric Operations, Northern Indiana Public Service Company, Hammond, Indiana.

Robert J. Baker, Technical Director, Wallace and Tiernan Division, Pennwalt Corporation, Belleville, New Jersey.

James C. Vaughn, Engineer of Water Purification, Department of Water and Sewers, Chicago, Illinois.

Donald I. Mount, Ph.D., Chairman, Lake Michigan Interstate Pesticide Committee, National Water Quality Laboratory, Environmental Protection Agency, Duluth, Minnesota.

Glenn Pratt, Sanitary Engineer, Office of Regulatory Programs, Water Quality Office, Environmental Protection Agency, Region V, Chicago, Illinois.

Mrs. Wendell Alexander, Citizen, Racine, Wisconsin.

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P R O C E E D I N G S

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MR. STEIN: Let's reconvene.

When we terminated yesterday, Mr. Henry was asked to speak and unfortunately we recessed before he could come up. We would like to call on Mr. Henry now.

MR. HENRY: Mr. Chairman, yesterday after I had terminated my remarks and while Mr. Petersen was at the podium, I understood you to characterize my comments as a personal attack on Mr. Mayo without a scintilla of evidence in support of those remarks.

Now, obviously I think you were joking, but jokes don't often come across on the record and, therefore, I think I have to make a statement in this regard.

As you will recall, the only reason that I named Mr. Mayo was that you pointed out that I was incorrect in referring to the Federal conferees in the plural, and I apologize for that mistake. I admit to confusion because of the fact that there are four Federal people -- or were at the first day -- on the podium, and there were four Federal people on the Technical Committee. But I apologize for my error in referring to the Federal conferees in the plural to the extent that I made the remark that the

Federal conferees had indicated that if they did not get the cooperation of the State conferees, they would use whatever methods were available to them to ensure that the Federal point of view prevailed. I think I recall that both Mr. Mayo and you made a remark along those lines, and, therefore, I will amend my statement in that regard by saying that the Federal conferee and the Chairman made such remarks, and I am sure if I am in error on that point you will correct me.

With regard to --

MR. STEIN: May I do that now? The Chairman never made a statement on that at all, and I think the record will show that.

MR. HENRY: All right. The record will show whatever it shows, and if I am wrong in that I apologize.

With regard to a personal attack on Mr. Mayo, obviously I made no such attack. I did make an attack upon the administrative procedures that are being followed here, and I have no way of knowing at all that Mr. Mayo is responsible for those procedures. Even if he is, obviously by attacking those procedures, I am not making a personal attack on Mr. Mayo; and with regard to your comment about a scintilla of evidence, at the risk of getting myself into further difficulty by using a Latinism -- another Latinism --

I will say that the arbitrary nature of the proceeding we have been following here is a case of res ipsa loquitur. And may I also suggest that if you have any comment on my statement yesterday or upon my statement this morning, that you make it now while I am at the microphone and not subsequently when I have to go through this kind of procedure to reply to it.

MR. STEIN: Mr. Mayo, do you --

MR. MAYO: Well, obviously, I was for myself quite disturbed at what I interpreted as a rather personal attack on my professional integrity and my integrity as an administrator representing the Environmental Protection Agency.

I am pleased to hear your comment this morning, which I would interpret as something of a clarification on your part on that point.

MR. HENRY: Let me just say that I apologize if anything I said came across as a personal attack, because I didn't mean it that way.

MR. STEIN: Right. Maybe we can clearly clarify that.

As I recall — I think the record will show — I am not sure how many Latinisms we used, but the first remark appearing in the record on scintilla of evidence was contained in your presentation. But what I was addressing myself was not to the procedure here but if I am incorrect, let me see if this is at the point.

You said that a position — factual position on the proposal that Mr. Mayo presented to this Conference, as the Federal conferee, was apparently concocted overnight. That has nothing to do with the procedure. I asked Mr. Mayo about that and he, as I recall his statement for the record, said that was patently incorrect or false.

Now, I think that was the issue. My remarks were not directed to any judgment that someone may have on the procedure, which is prescribed by statute, but that was the point.

Also, if the point was made that Mr. Mayo apparently concocted something overnight for presentation here, I did not see for the record any supporting evidence for that statement.

Now, maybe I am incorrect on that, and perhaps you and Mr. Mayo can work this out. But that is the way the record seems to me. I wouldn't characterize this as a personal attack or anything of that sort.

MR. HENRY: Well, thank you, Mr. Chairman. I don't wish to prolong this. I meant no personalities; I was addressing myself to procedure only.

MR. STEIN: Right.

MR. HENRY: Thank you.

MR. STEIN: May we go on with the companies.

MR. MILLER: Wisconsin is first.

MR. STEIN: Wisconsin.

MR. FRANGOS: Mr. Chairman, I have a statement of the Wisconsin Public Service Corporation that I would like to submit for the record at this time.

MR. STEIN: Without objection, that will be entered into the record as if read.

(The statement of Evan James, Vice President, Power Generation and Engineering, Wisconsin Public Service Corporation, follows in its entirety.)

STATEMENT OF WISCONSIN PUBLIC SERVICE CORPORATION PREPARED FOR THE THIRD SESSION OF THE LAKE MICHIGAN ENFORCEMENT CONFERENCE CONCERNING THERMAL DISCHARGES TO LAKE MICHIGAN SCHEDULED FOR MARCH 23 AND 24, 1971

* * * * * * * * * * * * * * *

I am Evan James, Vice President - Power Generation and Engineering, of the Wisconsin Public Service Corporation. This Corporation is an electric and natural gas utility serving northeastern Wisconsin. A statement on behalf of this company was presented at the previous session of this conference held during the week of September 28, 1970. I will not repeat the description of its environmental studies and continuing program relating to the construction and proposed operation of the Kewaunee Nuclear Generating Plant now being built on the shore of Lake Michigan near Kewaunee, Wisconsin. The unit is to be jointly owned by Wisconsin Power & Light Company, Madison Gas & Electric Company and Wisconsin Public Service Corporation, with the latter being the operating partner.

Up until yesterday, based on the notice given us of this meeting, it was my understanding that the purpose of this reconvened session of the Lake Michigan Enforcement Conference was for the purpose of considering the Recommendations of the Lake Michigan Enforcement Conference Technical Committee on Thermal Discharge to the Lake. Since early yesterday, the Conference appears to be addressing itself to some other recommendations.

Be that as it may, I believe it is still appropriate that the Technical Committee Report not be ignored, and also, as it is the only written report I have been given the opportunity to review and evalute, I shall direct my comments to that report and its conclusions. By so doing, I in no way am indicating that my company feels it should not be afforded a full opportunity to address itself to the new proposals presented here for the first time. It should be granted a reasonable time to study and evaluate the recommendations. The imposition of the enormous cost which would result if these recommendations were made enforcible on particular utilities and their rate payers should not occur without conclusions being reached which are based upon sound factual findings.

I'll now proceed to comment on the Technical Committee's Report.

A most, if not the most, significant aspect of the document is its inability to describe present or anticipated ecological damage to the Lake based upon any scientific data. The document variously states: "It is obvious that further field studies are warranted and necessary to determine ecological impact on Lake Michigan" (p.3) and: ". . . there has been no demonstrated significant damage at existing Lake Michigan thermal plume sites from artificial heat inputs: (p.4). Of further significance in this area is the Committee's statement that "The amount of waste heat in a body of water is always in equilibrium with the atmosphere and cessation in inputs will result in an almost immediate return to the natural temperature regime" (p.5). Two conclusions are apparent from these Committee observations:

(1) At least as of this time there is no demonstrated thermal damage to the Lake, and

(2) Thermal effects which might occur after experience are not irreversible, but, on the contrary, the Lake's equilibrium can be re-established.

These two findings of the Committee would seem to lead to a simple and obvious conclusion: Until there is more experience with thermal discharges and close observation and study of the effects of such discharges, there is no justification for shutting off Lake Michigan as a source of cooling water for electric generating plants. To do so would be to place an unnecessary burden on the utility customer - a burden for which there is no demonstrated need. This does not make economic sense, and if no further heat is discharged into the Lake, it can never be demonstrated that the ecology had been protected from anything.

The conclusion that it is premature to place restrictions on Lake use is, of course, tremendously reinforced by the recently published report of the Argonne National Laboratory's Center for Environmental Studies and Radiological Physics Division to the effect that thermal discharges into Lake Michigan are "negligible and will continue to be so for the rest of this century". The Argonne report also significantly points out that the ecological effects of cooling towers are not known - this fact also should make us proceed carefully and with firm knowledge of all consequences.

And may I say at this point that it could well be that I and the Technical Committee are not in basic disagreement. The heart of the Committee's recommendations would seem to be its paragraph 4 on page 8. There the Committee recommends that all generating facilities be required to have closed cycle cooling systems or some other technique "under construction by a date considered reasonable and appropriate by the Conferees". The recommendation is then qualified by eliminating the need for such construction by such date "unless it has been conclusively demonstrated . . . that ecological damage does not or will not occur from once-through cooling". It is probably true that the difference, and I think it is important, between my viewpoint and this recommendation is one of emphasis only. The Committee seems to say the utilities should spend their millions of dollars if by a certain date a complete absence of ecological damage has not been conclusively demonstrated. I would respectively suggest that the emphasis should be somewhat tempered. By all means scientific study should be, as it is planned to be, continued until conclusions can be drawn one way or the other. Once firm conclusions are available, then the manner and extent of corrective measures, if any are needed, can be determined. Leaving the final conclusion open for making decisions after the facts are in would seem to be the way to avoid needless expense and avoid guesswork as to when and what if anything should be done. Since the Technical Committee has not in fact recommended a specific date on which the decision should be made--a very slight modification of its paragraph 4 would appear to meet the utilities' and the public's needs. Rather than to suggest some date be designated for the construction of cooling systems, both the type of system and the time should await the results of post-operative surveys. My company will cooperate to the full both with personnel and the necessary expenditures to conduct the studies necessary to establish the fact of thermal effect on the Lake.

With reference to the suggested backfitting of operating plants, which was mentioned yesterday and implied to be an easy task to which I might take some exception--I refer to such plants as Pulliam, Edgewater, Port Washington--it appears that the Conference would be reaching far--to require substantial alteration of these plants--some with units 30 to 40 years old. Where there is no conclusive proof that these plants, operating over the many years, have damaged the waters of Lake Michigan.

In conclusion, may I introduce one other consideration which appears to get overlooked as we concentrate our attention on Lake Michigan. I believe we must look at the overall question of the conservation of our resources beyond those existing within the Lake. I refer to the conservation of our sources of energy, specifically uranium and coal. I believe I can best illustrate my point by an example.

If it were found advisable to install cooling towers on, say, a 500 MW plant such as Kewaunee, the effect of this cooling device on the efficiency of that plant would be such that in the 30 year life of that plant an additional 100 tons of uranium would be consumed to generate the same number of kilowatt hours. I repeat--an additional 100 tons would be used.

To express this in coal (another source of our energy and about which most of us have a better concept) the decrease in efficiency at Kewaunee would necessitate the use of an equivalent of 2,000,000 tons of coal in 30 years.

This is the tapping of our energy resources which should not be overlooked as we view the Lake Michigan environmental question.

MR. STEIN: While that is being distributed, I would like the conferees to consider this. I have had several requests individually from conferees that we finish the thermal matter with the industries, then the Conference will go into Executive Session, and that Executive Session will be held right here in public, as I understaand it, and then we will try to come to a conclusion, if we can, on thermal matters, then go back into public session and take up the other matters which are on the agenda.

Do you have any others, Mr. Frangos?

MR. FRANGOS: No further from indsutry.

MR. STEIN: Indiana.

MR. MILLER: Mr. Chairman, I have Mr. Kern for the Northern Indiana Public Service Company.

I might say this was handed to the conferees. It is Mr. Pelletier's statement.

STATEMENT OF J. A. PELLETIER, VICE PRESIDENT, ENGINEERING AND ELECTRIC OPERATIONS, NORTHERN INDIANA PUBLIC SERVICE COMPANY, HAMMOND, INDIANA (READ BY CHARLES KERN)

MR. KERN: Mr. Chairman, conferees, my name is Charles Kern. I am making this statement today on behalf of Mr. J. A. Pelletier, Vice President, Engineering and Electric Operations, Northern Indiana Public Service Company, Hammond, Indiana.

The stated purpose of this Conference is for consideration of the Technical Committee's Report to the conferees of the Lake Michigan Enforcement Conference. I intend to address my remarks to this purpose.

The Technical Committee Report of the Lake Michigan Enforcement Conference, dated January 1971, states on page 4: "The Committee recognizes the value of receiving water temperature standards but, since there has been no demonstrated significant damage at existing Lake Michigan thermal plume sites from artificial heat inputs, the assignment of numerical effluent values or other engineering design requirements at this time would be arbitrary and not defensible."

The report further states on page 5: "Unlike many other waste problems, there is limited concern about persistence or buildup in the water environment or other biological magnification (such as with toxic substances) or about a direct effect upon the health or safety of man. The amount of waste heat in a body of water is always in equilibrium with the atmosphere and cessation in input will result in an almost immediate return to the natural temperature regime. The behavior of waste heat in Lake Michigan is also significantly different than it is within the predictable confinement of a flowing stream. The committee believes that the above characteristics of the waste heat problem in Lake Michigan are such that they do allow a period of time for the establishment of sensible controls."

In view of the above statements from the committee report, we believe adoption of the committee recommendation No. 5 on page 8 would provide the most sensible approach to controls and assure that all of the other recommendations of the committee are thoroughly studied before being acted upon without adequate investigation. Any action prior to a thorough study could provide economic waste, and in fact could have an adverse effect on the environment.

Recommendation No. 5 states: "The committee further recommends that in-depth field and laboratory studies to determine the effects on the ecology be conducted under the guidance of a technically competent steering committee appointed by the Lake Michigan Enforcement Conference. The studies should determine the physical and biological effects on Lake Michigan of heated discharges from thermal electric power generating facilities and the effects on organisms in the cooling water passing through these facilities."

NIPSCO would be willing and would appreciate the opportunity to work with a technically competent steering committee to obtain substantive information which would determine criteria and standards for Lake Michigan. NIPSCO is presently engaging in comprehensive site studies and has joined with other utilities serving areas adjoining Lake Michigan in sponsoring a broad inventory of Lake conditions.

That is the end of this statement and I would like to add just a comment of my own that the inventory which the electric utilities has gone into a second stage and is continuing on.

Thank you.

MR. STEIN: Thank you. Are there any comments or questions?

If not, thank you very much, sir.

May I call on Michigan? Mr. Purdy.

MR. PURDY: I am wondering if Mr. Baker, Technical Director of Wallace and Tiernan is here.

Mr. Baker.

STATEMENT OF ROBERT J. BAKER, TECHNICAL DIRECTOR, WALLACE AND TIERNAN DIVISION, PENNWALT CORPORATION, BELLEVILLE, NEW JERSEY

MR. BAKER: I am Robert Baker, Technical Director, Wallace and Tiernan Division of Pennwalt Corporation.

Mr. Chairman, I have a prepared statement here concerning Recommendation No. 8 of the Technical Committee. The statement is essentially against the substitution of mechanical cleaning for chlorination in condensers, and I would like to make a few remarks about the proposed Federal regulation which is essentially the same thing, I believe.

For the last 2 days I have been trying to get a hold of a copy of the proposed regulations and I have been unable to. As I recall, it says in different words, about the same thing about the substitution of mechanical cleaning, but it goes about it on the basis of: There shall be no chemicals -- I am quoting from memory here -- no chemicals used -- do you have one?

MR. FETTEROLF: Yeah.

MR. BAKER: It is No. "4. Fouling problems shall be solved by use of inert chemical devices. In exceptions where antifouling chemicals must be used to supplement mechanical devices or as an interim measure, the concentrations at the point of discharge shall not exceed the 96-hour TL_m concentration for fishes and important fish food organisms."

I don't know exactly what that means. However, on the basis of a statement by Dr. Mount, which incidentally this whole subject is covered in a 7-line paragraph, I would assume on the basis of the tests where they were using Daphnia and demonstrated effects on a part per billion level, that this would essentially eliminate chlorination for any use at all.

Now, there was no workshop hearings on this point. It cropped up rather unexpectedly in the Technical Committee recommendations. We were exposed to this for the first time, I guess, on Monday in the Federal -- recommended Federal standards. And to me this statement of this -- of the recommendation as well as -- incidentally the paragraph I am speaking of in Dr. Mount's report is on page 12 -- the third paragraph on page 12.

Now, this seems to me to reflect a complete misunderstanding of both the mechanics and the chemistry of the chlorination of condensers. Yesterday afternoon, Mr. Miskimen mentioned briefly how -- what the practice was. I would like to review those parts which are important from this aspect.

First, we do not chlorinate water -- that is, the purpose is not to chlorinate cooling water. The cooling water is used only as a means of carrying residual chlorine to the deposits in the condenser tube.

Now, in case you are not aware of it, water has what is known as chlorine demand. Let me give you an example. In order to maintain a residual level of available chlorine of, say, 1 milligram per liter or part per million, the dosage required, the amount applied, may be in the order of 4 or 5 parts per million. The difference between the amount applied and the residual is called chlorine demand.

Now, condensers are chlorinated on a program basis, i.e., while the plant is operating, a condenser or one-half -- possibly even half a condenser will be chlorinated at a time. The total elapsed time from the time the chlorine is applied to the cooling water until the water is through the condenser is in the order of 20 or 30 seconds. At this time, it mixes with the other cooling water from the other condenser or the other half of a condenser, and the chlorine demand in that water immediately reduces the available chlorine. So the total time of contact of any organism passing through that condenser with residual chlorine is a matter of only a few seconds.

We think of this in terms generally of 20 to 30 seconds.

Now, in this proposed regulation of a 96-hour TL_m, there isn't any conceivable way that an organism around a powerplant discharge would be exposed to any chlorine for 96 hours. It is impossible. It couldn't even be done for 96 minutes, and it is more likely that a 96 seconds would have about a 3-to-1 factor in it, so the use of such a standard borders on the ridiculous, in my opinion.

Now, in these studies and the TL_m -- it is a time concentration relationship -- if the time is reduced, the concentration which will not cause damage is increased tremendously. This is not a linear relationship.

I am not a biologist incidentally but I would expect without any question that if this 96-hour limitation -- that is the concentration involved were 96 hours -- if the 96 hours were reduced to 96 seconds, there will be a change in concentration of at least a thousandfold and this puts us back up in the area of present practice of residual concentration levels in the order of a half to one part per million; and at these levels, and at these very short contact times, there has been no demonstrated effect on the biological system of the water passing through a condenser, not that I am aware of at all.

My firm has done more research in the area of water chlorination than any in the world, and we have been involved in the chlorination of heat exchangers for over 45 years. I am sure if there had been any major damage it certainly would have come to our attention.

Now, I would like to recommend one of two things: Either you drastically change the 96 hours -- and I realize this might not be possible, because this may be a standard test. I don't know why that should bother the Federal people, however, because in the studies showing that less than a part per billion of chloramines -- there is no standard test which can measure a part per billion or less, as the words are here, in the water anyway. So they have used a nonstandard analytical method -- I don't know why they wouldn't be prepared to use another nonstandard method as long as they are setting Federal standards anyway. But I have even a better idea. Why don't you discard the thing completely? This has absolutely nothing to do with thermal pollution of cooling water.

Thank you.

MR. STEIN: Are there any comments or questions?

MR. FETTEROLF: Yes, Mr. Chairman. I would like to ask Mr. Baker if he is at all familiar with the Amertap system.

MR. BAKER: Yes, I am.

MR. FETTEROLF: The Amortap System involves the introduction of small balls into condenser tubes. Is this done as a batch type treatment? Do you introduce the balls all at once or are these balls continually circulating throughout the condensers?

MR. BAKER: They are continually circulating throughout the condensers.

MR. STEIN: Any other comments?

MR. FETTEROLF: Thank you.

MR. BAKER: I might add one other thing. As far as another comment here, there is an assumption -- this 7-line paragraph carries a lot, and another apparently is the assumption that mechanical devices are as effective as chlorination and, gentlemen, this is not true. You heard this statement yesterday. They are not in common use and they are not as effective as chlorination.

MR. STEIN: Are there any other comments or questions?

MR. MAYO: Dr. Mount has indicated the willingness to respond to a portion of the comments.

MR. STEIN: All right.

Dr. Mount.

Why don't you wait up here, you may want a rejoinder?

DR. MOUNT: I don't think that there is a problem at all as has been described and I presume that is because, as you said, you don't understand the 96-hour TL_m nor its application.

To begin with, if the residual chlorine drops, as you have described it does, after the other part of the condenser water is mixed with that part which is chlorinated and drops essentially to zero, as you have said, then there is no problem, because the recommendation says "... at the point of discharge ..." which would be after it is mixed, and if there is no condensation, there would be no toxicity and there would be no problem.

I suspect, however, there is a residual there, and in the standard way in which these tests are applied, one would take the discharge water -- a quantity of it -- and put the animals in it and determine whether or not they died. And if a part per billion were there, it would have to be there for quite a long period of time during the 96-hour test in order to show toxicity.

So this recommendation does not say that there could not be a part per billion in the discharge at all. It says that if there is enough there to kill the animal during the period of the test that would be too much.

You also commented that you could see no way in which these animals could be exposed for 96 hours. It is entirely possible that it wouldn't be a full 96 hours, but I think that your comments that it would be 96 seconds are equally ridiculous.

The point is that we are talking about animals such as plankton, and fish fry which cannot swim but which will be floating with the discharge water in the plume, and they will be there for a substantial period of time if that plume is traveling down along the shore, for example, or in any direction, in a reasonably defined fashion, so that the water mass discharge is standing entire, the entrained animals floating in that water will be exposed to the discharge water for that period of time. And so it will be quite a bit longer than the 96 seconds that you have proposed. Now, this would not be true, of course, of a swimming fish, for example, which has the ability to propel itself around. But the point is that it is much, much longer than 96 seconds simply because the animals are floating in the discharge water and being carried by it.

I would repeat again though that if your assumption is true that the residual drops to essentially zero, then there would be no toxicity and there would be no problem.

MR. STEIN: Do you want to respond?

MR. BAKER: Well, we have done -- I will grant you -- no exhaustive tests because we weren't aware that was going to come up here. But we have been unable at all to find any residual chlorine of any kind in the discharges of powerplants with this type of procedure, which I am sure -- I think almost all plants at least on Lake Michigan operate on this circulation basis.

Therefore, if -- and I am still confused as to exactly what this recommendation means, if you are going to pull a sample of water from a condenser which is being chlorinated and take it to the laboratory -- and, by the way, I have seen this done -- this does not duplicate the test at all unless you dechlorinate the sample before it is taken.

Now, if we can go back to my contention, and your remark, that if there is dechlorination after the 20 or 30 seconds, how, then, do we apply this particular proposed regulation, this is what I don't understand.

MR. MAYO: The regulation that was proposed would be applied at point of discharge.

MR. BAKER: How do you define the point of discharge?

MR. MAYO: Well, as a general rule, in the issuance of waste discharge permits under the State processes, the discharge is identified, and a point of discharge can be identified. It might be the end of a jet type diffuser facility, or it might be the outlet of whatever works are installed to dissipate the discharge, and that would be the point of discharge.

MR. BAKER: Well, let me again clarify my question. If a sample is taken at this point and does not demonstrate any toxic effect to aquatic organisms, does this in effect, then, permit the use of chlorine for condenser chlorination under this proposed regulation?

MR. MAYO: I would think so. If it meets the suggested requirement there.

MR. STEIN: Are we all set?

MR. BAKER: Unfortunately I don't have the requirement to look at, but I guess so.

MR. STEIN: Thank you.

MR. BAKER: Thank you.

(Mr. Baker's prepared statement follows in its entirety.)

Robert J. Baker
Technical Director
Wallace & Tiernan Div.
PENNWALT Corp.
Belleville, N.J.

March 19, 1971

These comments are directed particularly to Section 8 of the conclusions and recommendations of the January 1971 Conference Report on thermal discharges to Lake Michigan.

The premise on page 6 of this Report that "ecological damage must be assumed until it is shown otherwise" is the equivalent of "guilty until proven innocent". The practice of chlorination to control heat exchanger fouling has been practiced for over 45 years throughout the world without any observed detrimental effects on the cooling water discharged when chlorination is properly controlled. This, no doubt, accounts for the scarcity of information to protect it against a charge of ecological damage.

The beneficial effects of chlorination of water are known, however, and some aspects of this relating directly to condenser operation will be considered briefly.

There is a general impression that the purpose of chlorination is to treat cooling water. This is not so. The water is used merely as a carrier for chlorine to cause the disengagement of organic and inorganic deposits on the tube surface to maintain heat exchanger capacity. Chlorination is not applied for the purpose of preventing fouling of the condenser tubes by treating the water but to remove deposits after they are formed. This is done by intermittent application, carefully controlled and programmed. It is a corrective, not a preventative measure. It is not chemical cleaning in the generally accepted definition of that term.

The fact that the residual chlorine level approximates that used in the treatment of municipal water and wastewater is testimony in itself.

However, even this comparison can be misleading for two reasons. First, the effect of chlorine on biological life is influenced, among other factors, by the level of residual chlorine and the time of contact. For levels approximating 1 mg/l, the times required for the destruction of bacterial cells range from several minutes to over an hour, depending on species and other factors. The total contact time of chlorine with a specific volume of cooling water is a matter of seconds (usually less than 30) instead of minutes. This occurs in the condenser. Upon discharge, the water is immediately mixed with unchlorinated water.

This brings us to the second factor to be considered. Any residual remaining in the cooling water is lost to the unchlorinated water. This is due to chlorine demand. Chlorine demand is the difference between chlorine applied and residual chlorine. Again, time is a factor. Where it is desired to carry a residual for a long period, more chlorine must be applied. Municipal water supplies are chlorinated to provide a residual for hours, this being necessary to ensure disinfection. For the very short time of contact in once-through cooling water systems, the chlorine demand and, consequently, the amount of chlorine applied is less. This is why chlorine is applied as close as possible to the condenser inlet, which in turn is why the contact time is so short.

The time of contact must not be confused with the duration of a chlorination cycle. Contact time refers only to the time it takes for water to pass through a condenser.

Completely ignored in this matter is the beneficial effect of satisfaction of the chlorine demand. Chlorine, being an oxidant, reacts with reducing substances, both organic and inorganic, in the water. The net result is a reduction in the oxygen demand, and the enhancement of the quality of the water. The extent of the chlorine demand is directly related to water quality. Thus, the greater the demand, the greater the beneficial results from a chlorination program. No such results occur with mechanical cleaning.

It is our opinion that the beneficial effects from condenser chlorination more than compensate for any effect on biological life that may occur in the very short time exposure available.

RJB:GMH

MR. STEIN: May we call on Illinois, please?

MR. CURRIE: So far as I know, Mr. Chairman, we have no other witnesses on the thermal question.

MR. STEIN: Wisconsin?

MR. FRANGOS: We have no further witnesses.

MR. STEIN: Indiana?

MR. MILLER: Mr. Chairman, as far as I know, we have no further witnesses.

MR. STEIN: And Michigan?

MR. PURDY: No further witnesses that I know of, Mr. Chairman.

MR. STEIN: Are there any further witnesses on the thermal question?

If not, I am going to ask the conferees whether they want to take up the thermal matter at the present time. If they do, the conferees will be in Executive Session until we complete that, and we will consider it.

I will ask for your advice, too, before we do that on the requests to hold the record open for 2 weeks, and the request that no determinations be made on this thermal question until we receive that at the end of 2 weeks.

Now, obviously, if I make that first ruling, it won't be pertinent to have the Executive Session, so I am going to try to canvass the conferees and get their views on both these and determine how we will proceed.

Mr. Mayo, do you want to start?

MR. MAYO: I beg your pardon.

MR. STEIN: Do you want to comment on that?

MR. MAYO: Well, Mr. Chairman, I feel there is an obligation on the part of the conferees to leave this session with the strongest possible recommendations that they can make to the Administrator -- (Applause) -- for a package of corrective actions relating to thermal discharges.

The request for the keeping of the record open for another 2 weeks on its face is not reasonable. I do feel, however, that the conferees can proceed, at this point, on a very deliberate and productive discussion of specific recommendations to be made to the Administrator and the record also be kept open for the submission of whatever additional materials the power industry people think are in their best interests.

But I do feel that there is a burden on the conferees to face up to this issue this morning and to develop a set of meaningful and specific recommendations.

MR. STEIN: Mr. Purdy. Do you care to comment on the full proposal, not necessarily Mr. Mayo's comments?

MR. PURDY: Well, I hope the remarks are not taken to mean that the conferees have been unwilling to face up to this in past meetings.

FROM THE FLOOR: Only a year.

MR. PURDY: There have been many confusing positions placed before the conferees at the last moment, and I think the conferees have attempted many times to resolve this matter.

I do recognize the desirability of allowing everyone the opportunity to give the conferees the greatest amount of guidance. However, if we leave or postpone the decision for 2 weeks for some additional information, I am fearful that at that point in time there would be a request by others for another 2 weeks to file additional information to respond to what would be received at that time.

I do have the feeling that in the last several meetings, I am hearing the same things that we have heard at earlier meetings. I do recognize, I believe, that this Conference is not a standard-setting Conference, but it is one that will make recommendations to the Administrator for him to forward back to the States for implementation under State laws, and that in the standard-setting procedures under the Federal law, the States must hold public hearings, and that any additional information that might be pertinent to the guidance of the States and the adoption of standards can be presented to the States at their public hearings. And so, therefore, I feel that we ought to move forward at this time.

MR. STEIN: Thank you. (Applause)

Mr. Miller.

MR. MILLER: Mr. Chairman, conferees, I too feel that we have been on this subject long enough, and that we are now at the stage where we can adopt some recommendations to the Director of EPA and that these, then, will come back to the States, and there will be time for public hearings and actions.

As you probably know, we in Indiana have been delaying amendment to the Lake Michigan Water Quality Standards, Requests for improvements in these were made a little over a year ago pending decisions that would be made by this Conference.

I think that it is perfectly in order that the record be held open for a 2-week period for information which could be used for guidance both by the Director of EPA and to the various State water pollution control agencies in carrying out the recommendations of the Conference, And I would, therefore, recommend that the conferees come to grips with the decision this morning.

MR. STEIN: Thank you. (Applause)

Mr. Currie.

MR. CURRIE: I wonder, Mr. Chairman, whether those who gave us a brand new proposal at the last minute really expected that we would be able to evaluate and approve it intelligently overnight. But I do think it is time we got down to brass tacks and started talking about the substantive thermal issue.

MR. STEIN: Mr. Frangos.

MR. FRANGOS: Mr. Stein, I concur in the suggestion that we move into an Executive Session to discuss the Federal proposal for coming up with some recommendations. I also would agree that we ought to leave the record open for 2 weeks so that the companies and any others who want to add to the record may be able to do so.

I would further suggest that perhaps we might start the Executive Session by having a review from the Federal conferee of not only the proposal as he understands it and as it perhaps defines Mr. Ruckelshaus' recommendations to us, but also what the mechanics of our recommendations mean, and exactly what we are going to be doing here in the Executive Session.

MR. STEIN: All right. Before we go, I think, Mr. Frangos, you might take into account Mr. Purdy's statement of what he thought we were doing here, and, as far as I see, that is the way I read the law. That is, under the law, in the Conference procedure you make a recommendation to the Administrator, who in turn sends back a recommendation to you, which may be the same one or a modified one, for appropriate action under the State and local law. But we will let the Federal conferee expand that, but I think that is a bare statement of what the law provides and, as you know, this law we are operating under is a very detailed statute. It doesn't leave much leeway.

I think the Congress, as it said, in passing the law, made it so detailed because they wanted to ensure that certain specific procedures were followed.

Let's get on. I think in view of the statements of the conferees, the record will be held open for 2 weeks. All of the people here who indicated that they wanted to put in additional information should send that in. That will be included in the transcript which will be sent to the Administrator.

Executive Session

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MR. STEIN: At the present time, we are standing in Executive Session. To people who are not familiar with our procedure we operate very often on the fishbowl technique where we have these Executive Sessions that are open. The people whom we call on in Executive Session are the conferees who, of course, may call on any technical backup that they may have brought with them and the rest of the people, of course, are privileged to visit.

I think in opening the Executive Session, we might follow the suggestion of Mr. Frangos and ask Mr. Mayo if he wants to lead off.

MR. MAYO: Your remarks, Mr. Frangos, were directed, I think, to two parts: 1) a review of the proposed recommendations and 2) a detailing of the conference procedure and its relationship to the States in terms of their obligations and commitments.

I prefer to speak to the first part and defer to Mr. Stein for the second part.

MR. FRANGOS: I am wondering, could we have that second part first?

MR. STEIN: All right. Do you have any other specific questions other than the ones I —

MR. FRANGOS: Well, let me ask the

* Independent consecutive pagination due to urgency of transcription of the Executive Session.

specific question. In the past, the way we have operated in this conference and in others is when we have come up with a set of recommendations that we have concurred in we have submitted these to the Administrator (now), and he reviews, and then in accordance with Federal statute he approves, and those, then, have some legal significance in terms of the way State law and Federal law may operate.

But let me give you an example. If we require secondary treatment by a municipality by a date certain, the very adoption by the Secretary* of that recommendation means that there is now a clearcut Federal jurisdiction in terms of enforcement, and this is the procedure that we are going through right now.

Now, here we have a proposal in front of us that in the details we will come up with some kind of specific dates that something has to be done by individual power companies.

Now, my question is: If this schedule goes in to Mr. Ruckelshaus, do we treat that time schedule legally in the same fashion that we have treated a municipality?

MR. STEIN: Yes.

MR. FRANGOS: Then indeed these are more than standards within that section of the Federal law.

MR. STEIN: I never said they were standards.

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*Administrator, EPA

Summary and Conclusions

I have to make that clear. I think a lot of you people feel you are talking in terms of regulations, which they are not, are talking in terms of standards, which they are not. What we are doing is you are making recommendations to the Administrator. The Administrator, in turn, if he believes that effective progress in abatement of pollution is not being made, he makes recommendations to the various States to take action under State and local law.

Now, most of the time but not all the Administrator has approved the recommendations sent forward. The chances of approval by the Administrator, of course, have always increased, as the past record shows, if the States are unanimous. If the States aren't unanimous then obviously a judgment has to be made.

The State is given an opportunity to take action under State and local law within at least 6 months. If after the termination of that 6 months the Federal Government or the Administrator does not believe that effective progress is being made, he can call a public hearing. The hearing, of course, changes the entire character. We don't just deal with the States but the alleged polluters become parties, as well as the States and the Federal Government at the public hearing. If satisfactory action is not being taken we can go to court action.

However, not to give you just part of the picture, we independently have standards violations. If you have a violation of standards, we can have 180-day notice action, or that of the River and Harbor Act, which means if anyone is discharging wastes other than sewage in a liquid form coming from pipes without a permit from the Corps of Engineers we can proceed to court. We have done so in seeking a fine under criminal provisions and also an injunction under the River and Harbor Act of 1899 as the case may be.

Now, these are independent actions. If we are thinking in terms of a standard, either the State has to request -- and you all have standards for your States -- has to request a modification of the standards already approved in your State and, just for the purposes of example, you would have to ask in Wisconsin that we modify the standards and we would have to hold a hearing and accept them. Or if the Administrator felt that you weren't forthcoming with the standards in a reasonable time, he could call for a conference of this kind and set the Federal standards himself with you and the other parties participating and then we could proceed.

Now, I know this sounds complicated, but that is because the law is complicated, and I have outlined to you what would happen. To recap this, we are in a conference procedure here making recommendations to the Administrator. The Administrator is obliged to do two things. He is obliged to make a summary of the conference under the law, and then if the Administrator believes that effective progress toward abatement of pollution is not being made, he is obliged to make a recommendation to the State to appropriate action and give it at least 6 months to take such action before he is authorized to take any further action under this provision of the law.

Again, let me make this plain: That 6-month provision does not hold if you move under another provision of law such as 1899 Refuse Act. It applies just under the conference procedure.

MR. FRANGOS: Well, thank you. That has been very helpful, Mr. Chairman.

MR. STEIN: Mr. Mayo.

MR. MAYO: As you know, in the past, there have been a variety of opportunities for even the Federal Government or the individual States to suggest or lay on the table proposed recommendations for the conferees to consider. On occasion, this might be done prior to the actual business of the conference as material that the conferees could appropriately address themselves to during the course of the particular conference session, and it is not unusual as a consequence of the session discussions and deliberations for those recommendations, whether they are put forth by the Federal Government or by the individual States, to be modified in terms of having them in keeping with the best judgment of the conferees in terms of the family of knowledge and facts that is available to them.

The material that was presented to the conferees at the opening of the session and made available to them the day before, was offered in that context as a package of prospective recommendations for the conferees to collectively consider, to give their best judgment to, and to use as effectively as they might be used as a focal point for the subsequent discussion and for the development of the recommendations that hopefully would go forward to the Administrator. So that the package of recommendations that were offered to the conferees were offered in that light.

As a consequence of the deliberations of the conference up until now, opportunities to have some discussion with the technical people who are available and to have some discussion with the State representatives, we would like to offer some modifications to the material that was made available to you for your consideration at the beginning of the conference session, and we gave each of the conferees this morning an amended draft of these proposed recommendations.

FROM THE FLOOR: Mr. Chairman, is there any obligation to furnish to those who are affected by these modifications a copy of them?

MR. STEIN: I thought there was a glass wall between us. We are in Executive Session. You are privileged to see what we are doing in the Executive Session, but this is an Executive Session.

FROM THE FLOOR: All right. I would like to have the record show that copies of the modifications were not made available to anybody --

MR. STEIN: Sir, I thought I indicated that for the Executive Session we are just going to hear from the conferees. Executive Sessions ordinarily are held behind closed doors. In very, very many instances, we hold Executive Sessions out in the open. I strongly endorse that procedure. But I ask the cooperation of all concerned.

Mr. Mayo.

FROM THE FLOOR: May I just note an objection to this as another example of arbitrary and capricious procedure.

MR. STEIN: Mr. Mayo.

Summary and Conclusions

MR. MAYO: If I may, gentlemen, in keeping with the open nature of the Executive Session, I would like to read through with you, for you, each of these items. Perhaps we can take them one at a time as we proceed and have whatever substantive discussion you feel you want to apply yourselves to.

In order to -- now, I will begin to read from the proposed recommendations.

Let me back up just a minute to Mr. Frangos' question about what main points we are addressing ourselves to.

In Mr. Ruckelshaus' letter to the conferees, he highlighted two specifically: 1) stringent standards be established to prevent damage from thermal discharges, and 2) the need to place limitations on large volume heated water discharges by requiring closed cycle cooling systems using cooling towers or alternative cooling systems on all new power plants and additions of such cooling facilities on plants now under construction.

This package of recommendations addresses itself specifically to those two points. And I will begin to read from the recommendations.

In order to protect Lake Michigan, the following controls for waste heat discharges are recommended by the conferees. Municipal waste and water treatment plants,and vessels are exempted from these recommendations.

I. Applicable to all waste heat discharges except as noted above:

1. At any time, and at a maximum distance of 1,000 feet from a fixed point adjacent to the discharge, (agreed upon by the State and Federal regulatory agencies), the receiving water temperature shall not be more than 3° F. above the existing natural temperature nor shall the maximum temperature exceed those listed below whichever is lower:

And then there are listed the monthly maximum temperatures as they appeared in the earlier draft. There was a modification to the January -- measured in the surface feet: January, 45°; February, 45°; March, 45°; April, 55°; May, 60°' June, 70°; July, 80°; August, 80°; September, 80°; October, 65°; November, 60°; December, 50°.

There was a modification here in the form of the parenthetical material that was not included in the recommendation that was originally presented to you.

The parenthetical material says "agreed upon by the State and Federal regulatory agencies."

Now, may we --

MR. STEIN: Do you want to take one of these at a time, or do you want to read them all first?

MR. MAYO: I think it would be appropriate to take them one at a time, Mr. Chairman.

MR. STEIN: If that is agreeable — unless there is an objection to this procedure from the conferees, are there any comments on I. 1. as read by Mr. Mayo?

MR. CURRIE: Mr. Chairman.

MR. STEIN: Yes.

MR. CURRIE: As I have already stated, I see no reason for imposing limitations like this on existing powerplants. It seems to me that the problem which we face is one of proliferation and that any effects from existing powerplants are minor and local, and it is not worth the money to require the corrections that are indicated here.

I also have some technical questions about the recommendations. For example, the definition of the mixing zone remains wholly ambiguous, so that no one can ascertain the impact of the proposal upon existing plants.

If there is going to be a mixing zone, it ought to be defined specifically.

MR. STEIN: Are there any other comments on this proposal?

(Whereupon, the Executive Session was interrupted by colloquy from the floor.)

Summary and Conclusions

MR. STEIN: Mr. Frangos.

MR. FRANGOS: Well, Mr. Chairman, I would like to ask Mr. Mayo to perhaps repeat again what he was talking about -- the parenthetical phrase that appeared in the original proposal. I just missed that. I would like to hear that again, please.

MR. MAYO: Do you have a copy of the original?

MR. FRANGOS: Yes, I do.

(Whereupon, the Executive Session was interrupted by colloquy from the floor.)

MR. MAYO: Mr. Frangos, if you have the two copies, after the word "discharge" in the second line would be added the "... (agreed upon by the State and Federal regulatory agencies)".

The difference is in the form of the inserted language in the front.

MR. FRANGOS: Well, I don't have any parentheses. That is my problem.

MR. MAYO: Well, let's get you a set of parentheses.

(Whereupon, the Executive Session was interrupted by colloquy from the floor.)

MR. FRANGOS: I'm sorry. This is different from mine.

Summary and Conclusions

(Whereupon, the Executive Session was interrupted by colloquy from the floor.)

MR. STEIN: Do you have a question now, Mr. Frangos?

MR. FRANGOS: Yes, I have a question, then, beyond the parentheses, and that is the definition of this fixed point.

MR. MAYO: The intent here is to provide to the regulatory agencies and the discharger some flexibility in the establishment of the fixed point from which the 1,000 foot distance would be measured in order to accommodate what would be a reasonable limitation for the size of the plume for that specific discharge within the context of 1,000 feet.

MR. FRANGOS: Does this, then, suggest 1,000 feet would be the maximum area irrespective of the method or point of discharge?

MR. MAYO: Measured from this fixed point. Now, the fixed point might be at the end of the discharge pipe for a particular discharge, depending on what it is going to be. If it is a discharge that has a configuration of diffusers, then there would be an opportunity to select a fixed point that is in keeping with the configuration of the diffuser and provide as a focus against which the 1,000 foot distance becomes a limitation, because we can envision that the discharge facility might take a variety of forms or a variety of configurations and the need for at least this kind of flexibility in establishing a specific point of reference from which the 1,000 feet applies.

MR. FRANGOS: So that the aerial extent of the mixing zone could exceed 1,000 feet?

MR. MAYO: In any one direction?

MR. FRANGOS: In any direction.

MR. MAYO: No. It might be circular and have a diameter of 2,000 feet, but the maximum distance would be 1,000 feet from the identified fixed point.

MR. FRANGOS: Would the maximum area of any mixing zone or the maximum diameter be 2,000 feet then?

MR. MAYO: Yes, under this, that is what it would be.

MR. FRANGOS: And if it were onshore, for example, then it could only be 1,000 feet. Would the maximum radius be 1,000 feet?

MR. MAYO: Yes.

MR. FRANGOS: And the maximum diameter would be 2,000 feet?

MR. MAYO: Yes.

MR. STEIN: May I ask Michigan, do you have any comment on this first point as written or proposed?

MR. PURDY: I am trying to get clear on what has been said.

MR. STEIN: Well, the glass wall isn't impervious to sound.

MR. PURDY: Well, I thought I was clear a couple of days ago on the wording, at that time, and I am wondering why the change?

It seems to me that this now has become more restrictive than the wording presented to us and explained to us the other day.

MR. MAYO: Well, all that is added is "... (agreed upon by the State and Federal regulatory agencies)." Just the parenthetical material is all that was added.

MR. PURDY: Okay.

MR. MAYO: Okay?

MR. PURDY: Yes.

MR. STEIN: Mr. Miller.

MR. MILLER: I don't have any questions, no.

MR. STEIN: Well, I am going to ask now, presumably --

MR. FRANGOS: I am sorry. Can I just try this once again?

MR. STEIN: Yes, sir.

MR. FRANGOS: That fixed point could not exceed 1,000 feet from the shore, is that correct?

MR. MAYO: No, no, no.

Take for example -- say there were a discharge pipe. In order to meet the following requirements for maximum monthly temperatures, that fixed pipe -- that discharge pipe might be 1,500 feet long, or it might have at its terminus a configuration of diffuser facilities, the discharge being at the terminus.

If you were to apply the 1,000 foot limitation and the location of the fixed point at the diffuser at some reasonable point, so you may have a diffuser here, here, here and here (indicating), a selected fixed point, and apply the 1,000 feet as the maximum distance from that point. And it could result in a 1,000 foot radius circule as the zone in which the maximum monthly temperature limitations would apply.

MR. FRANGOS: Okay. I think that does it.

MR. STEIN: Let me go through this again and see -- I assume, Mr. Mayo, that as you obviously put this forward you are proposing this. Now, let me check. Let me go down this side of the table. Mr. Purdy, do you have an objection to this, or are you willing to accept No. 1?

Summary and Recommendations

MR. PURDY: Ready to accept No. 1. I do find it rather odd that we are going through recommendations before making findings but --

MR. STEIN: I don't think there are -- why don't you talk? Are there any findings here?

MR. MAYO: No, we have gone directly into the recommendations. I am open to whatever recommendations Mr. Purdy or the conferees want to make on that point.

MR. PURDY: Well, it seems that we have totally ignored, at least right now, the report of the technical committee. There are a number of findings in that. There are some findings in Dr. Mount's paper, and it seems that someplace along the line that we have to make some findings to go along with our recommendations so that there is some basis for the recommendations.

MR. STEIN: Mr. Mayo?

MR. MAYO: Well, I would like to, at this point, offer for your consideration two findings very simply stated: 1) that there is a need for stringent and uniform standards for the control of waste heat into Lake Michigan from sources other than municipal waste and water treatment plants and vessels, and 2) that there is a need to place limitations on large volume heated water discharges by requiring closed cycle cooling systems on all new powerplants, and addition of such cooling facilities to plants now under construction.

MR. MILLER: Can you go through those again?

MR. STEIN: Why don't we take them one at a time.

MR. MAYO: Take them one at a time?

MR. STEIN: Yes, Mr. Mayo.

MR. MAYO: There is a need to establish stringent uniform standards for the control of waste heat discharges into Lake Michigan from sources other than municipal waste and water treatment plants and vessels.

MR. STEIN: Are there any comments on that?

MR. CURRIE: Yes, Mr. Chairman. It seems to me if we are going to make findings of fact which will later to lead to recommendations, the findings should not themselves be phrased as recommendations, but they should go back to more basic facts such as: What is the need? What is the reason for the need which is suggested in these proposed findings?

MR. STEIN: Before we do this, I would like to read a letter from a member of the press, and I do this for the consideration of the conferees. He says: "It does absolutely no good to hold your Executive Session in the open if you are discussing documents not generally available. We in the press for one can't be expected to follow what you are doing unless we have copies of the proposal and want to register a request that copies of your amended proposal be made available during your deliberations, otherwise your session might as well be closed."

There is no objection, of course, for any distribution of any document here, whether we are in open or closed session. But this is a prerogative of the people who prepare that document.

MR. MAYO: I would have no objection to that, Mr. Chairman, if the other conferees do not object.

MR. STEIN: Well, you can do what you wish. It is your proposal. Do you have copies?

MR. MAYO: All right.

MR. BRYSON: I can get some made.

MR. STEIN: Will you continue with the discussion, please?

MR. MAYO: Would you repeat --

MR. CURRIE: It seems to me if we are going to be making findings, we ought to be making findings as to basic facts and not findings that read as if they were recommendations and state merely the conclusion. I would be interested to know what are the facts which lead the Federal conferee to the recommendations which he is proposing.

and I would like, again, to ask my question: What are the reasons which cause the Federal conferee to depart from the conclusions of the technical committee?

MR. BANE: I would like to have the record show, at this point, that copies of the amendment were distributed to the press but were not offered to the members of the public or to any institution that is affected by the regulations.

MR. STEIN: I think everyone should be on notice here that the record will show what the members of the Executive Session say. If anyone wants to get a message into the Executive Session, he may follow the procedure we just did -- the press did -- and get a message in so that a member here can read it.

Mr. Mayo.

MR. MAYO: By way of a response, Mr. Currie, I think it is obvious that there do not now exist uniform State requirements in the form of Water Quality Standards for the control of waste heat discharges into Lake Michigan.

The standards that were adopted by the States of Indiana, Illinois, Wisconsin, were approved by the Secretary of Interior. The standards for waste heat discharges proposed by the State of Michigan was not approved. I feel there is a definite need for the States to address themselves to a package of reasonable uniform criteria which they feel they can individually adopt for the control of waste heat discharges into Lake Michigan.

The data that is proposed in section 1 point 1 here — the first subparagraph — in my estimation, is not in contradiction with the findings and recommendations of the technical committee. So I think that by way of an expanded finding, we might say that inasmuch as the States of Indiana, Illinois, Wisconsin, and Michigan do not now have uniform standards for the control of waste heat discharges into Lake Michigan, and inasmuch as the Water Quality Standards proposed by the State of Michigan for the control of waste heat discharges into Lake Michigan have not been approved by the Administrator, and in keeping with the need for the development of the adoption of uniform stringent standards for the control of waste heat discharges into Lake Michigan, that the States adopt the following — and that would be subparagraph 1.

MR. CURRIE: Mr. Chairman, it seems to me that the Federal conferee is once again stating the conclusion without giving the reasons. What I would like is a statement of what the evidence is of any need for strict controls of existing sources.

It is implicit in the recommended finding that there is such a need, and I would like the finding as proposed to include a statement of the reasons for the need.

MR. MAYO: Well, the reason, I think, is as obvious as the reason that the States have moved forward. Illinois, Indiana, and Wisconsin have adopted waste heat discharge requirements. I think the need to move, as has been suggested, is just as obvious and in keeping with the fact that the States have already moved, have taken official action in that direction.

This is a desire and expresses a need for those requirements to be uniform and puts them in the context of the material that was presented by Dr. Mount as being in keeping with the need for the protection of the aquatic organisms.

MR. STEIN: Mr. Mayo, I would like to interrupt with a procedural matter.

I have received a note from the representative of the Indiana Michigan Electric Company requesting a copy of the revised proposal of the Federal conferee which has been distributed this morning to the conferees and the press.

You can act on that as you wish.

MR. MAYO: I have no objection, Mr. Chairman. We will make copies available and distribute them.

MR. STEIN: Are there any other comments on this? Mr. Purdy.

MR. PURDY: Well, some of the remarks seem to indicate that if Michigan had only adopted standards like those of the other States that this issue would have been settled.

I am not of the opinion that if we had adopted them that it would have been settled. In fact it is my very clear understanding in our public hearings that those were not considered adequate by the Federal representatives that appeared at our public hearing.

MR. STEIN: Gentlemen, may I make a suggestion to you? I am prepared to stay here — I love Chicago — over the weekend. Now, if you want to spend time in the Executive Session going about what happened in the past and not look to the future that is great because I enjoy hearing it. But don't come to me after late Friday night and say I didn't get you home.

MR. PURDY: Well, some of these findings have found their way into public notices and also a review of our State plan, and I felt that it was necessary to comment on it.

From the standpoint of uniform standards, it is —

I am wondering if they must be uniform or if they must meet a certain base level.

Would it be, say, impossible for a State to adopt something more restrictive than what might be adopted by another State or the other three States.

Aren't we talking about a compatible standard that would meet a certain minimum requirement of the Administrator that he could approve rather than a strictly uniform?

MR. MAYO: The material, as you see it stated here in subparagraph 1, I think, is obviously offered in that context, and would come back to the States from the Administrator if he agrees for the States to take before their respective water pollution control agencies the hearing processes to which they are obliged to follow. If one of the States were to proceed with the adoption of the criteria more stringent than these for later submission to the Administrator's approval, I would be hard pressed to see that there would be anything but approval.

MR. PURDY: Okay. Now, from the standpoint of the findings, it seems that there are statements in both the technical committee's report and Dr. Mount's that are significant. Dr. Mount, early in his statement, noted that his discussion is based on an assumption that he thought was well accepted by informed people, and that is that the lake as a whole will not be warmed except in localized areas by powerplants; and although this may be well accepted by informed people, I think it would be valuable for the conferees to note this as one of the findings.

MR. STEIN: Do you want to — may I suggest, Mr. Purdy, if you have findings to suggest, you propose them to the conferees and let's try to act on them so we can move forward.

MR. PURDY: Okay. I am proposing this as one of the findings of the conferees.

MR. STEIN: Would you read the finding as proposed? I think you practically have it there.

MR. PURDY: The lake as a whole will not be warmed except in localized areas by the discharges of waste heat from the powerplant?

MR. STEIN: Are there any objections to that as adopted as a finding? If not —

MR. CURRIE: Mr. Chairman.

MR. STEIN: Yes, sir.

MR. CURRIE: I certainly agree with that finding. But it seems to me we should not proceed piecemeal about this without a full set of recommended findings.

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MR. STEIN: I think that is a -- yes, sir -- we will -- I will check each one for an objection and then we will come back and give you an opportunity to look at the whole set. Okay?

MR. CURRIE: I would like to suggest, Mr. Chairman, that there is an elaborate set of findings in a letter which the Illinois Pollution Control Board sent to you on February 2, 1971, and I would like to suggest that the conference adopt that letter as its findings with regard to this conference.

MR. STEIN: Let me suggest this. Mr. Purdy has the floor now suggesting his findings. If he wants to waive that to consider that procedure, it is all right. Or we can go with Mr. Purdy's and take your suggestion up later. We can make Mr. Currie's letter part of the record.*

MR. PURDY: Well, any way that we can speed this up and I don't have a written set of findings to work from and right at the moment I don't have Mr. Currie's February 2 letter and if he could furnish copies of this it might speed it up.

MR. STEIN: Do we have copies of that to distribute so people could look at it? I am talking about the mechanics of that.

MR. CURRIE: We can get them for you very quickly.

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* The February 2, 1971 letter follows.

STATE OF ILLINOIS
POLLUTION CONTROL BOARD
189 WEST MADISON STREET SUITE 900
CHICAGO, ILLINOIS 60602

DAVID P. CURRIE, CHAIRMAN
SAMUEL R. ALDRICH
JACOB D. DUMELLE
RICHARD J. KISSEL
SAMUEL T. LAWTON, JR.

TELEPHONE
312-793-3620

February 2, 1971

Murray Stein, Esq.
Chief Enforcement Officer
Federal Water Quality Administration
United States Department of the Interior
Washington, D. C. 20242

Dear Mr. Stein:

The Illinois Pollution Control Board, as the body charged with exclusive state authority to adopt water quality standards, effluent standards, and other regulations relating to water pollution in the Illinois portion of Lake Michigan, will attend and expects to participate as a conferee in the coming sessions of the Lake Michigan Conference, as it did in the Conference sessions held in Chicago last Fall. Please inform me as to the agenda as soon as possible so that we may be prepared to discuss whatever subjects you expect to consider.

On the assumption that one purpose of the coming sessions is to attempt a resolution of the pending controversy over thermal standards for the Lake, the Board has authorized me to make the following statement, which we are sending to all the Conferees and which I ask that you make a part of the record.

The Illinois Pollution Control Board in late 1970 conducted four days of public hearings on various proposed thermal standards for Lake Michigan and participated actively in the five-day Conference proceedings on the same subject. We have carefully studied the record in those proceedings, and we are agreed on the following points:

1. The area that would be raised in temperature more than 5° by the heated discharge from a 1000 mw nuclear plant, designed so as to maximize dilution, could be limited to the order of ten acres, and the area raised 2° to the order of 100 acres.

2. Such a plant could be built so that any given particle of water, or any organism, drawn through its condensers would be exposed to temperatures 20° above ambient for two minutes during passage, and any particle or organism discharged or entrained would be exposed thereafter to temperatures more than 10° above ambient for the order of forty-five seconds, more than 5° for six minutes, and more than 2° for one and a half hours.

3. A properly designed discharge structure can avoid any significant increase in temperature on the lake bottom or along the shore.

4. The lake as a whole would not be perceptibly warmed by even a tenfold multiplication of present generating capacity on the lake with once-through cooling, if there were perfect mixing.

5. Perfect mixing, however, is not possible. Consequently, if no limits are imposed the proliferation of electric plants along the lake may result in the warming by several degrees of a large fraction of the inshore waters, especially in the southwest portion of the lake.

6. The interaction of two or more thermal plumes may have a more than linear effect on the area affected by a rise in temperature and on the residence time of any particle at elevated temperatures.

7. A single 1000 mw nuclear plant will create a zone of a few acres uninhabitable by fish during the warmer months and unsuitable for spawning and other significant fish activities at various times.

8. Many, but an unknown percentage, of organisms passing through the condensers of such a power plant will be killed or damaged by heat and by physical shock.

9. A single large plant located in a spawning ground or across a migratory route would significantly disrupt the balance of the affected species throughout the lake.

10. The residence time of algal cells in the heated plume from a properly designed single 1000 mw plant is too short to cause any detectable shift to less desirable species, and no increase in total algal mass is to be expected.

11. Unless it is located so as to interfere with spawning or migration, a single 1000 mw plant will have local effects as noted above but will not upset the balance of the lake as a whole.

12. Unlimited proliferation of electric plants along the lake could seriously worsen the problem of nuisance algae by favoring the less desirable species and could seriously alter the balance of fish and other organisms in the lake as a whole.

13. Various alternative methods of heat disposal are technically feasible, including wet and dry cooling towers, cooling ponds, and spray canals. The backfitting of all but dry towers is feasible.

14. To backfit wet towers at the 2200-mw nuclear plant, now under construction at Zion, Illinois, would cost somewhere from fifteen to seventy-five million dollars; at a maximum this would cost residential customers each sixty-nine cents per month.

15. All alternative cooling means may have some undesirable environmental effects. Wet towers can cause fog problems; the Commonwealth Edison Company estimates fog from a wet tower on five to thirty mornings per year at Zion, usually in unpeopled areas. All towers discharge some polluted blowdown water that must be treated before release. Dry towers may cause as yet undetermined meteorological changes. Both wet and dry towers are bulky and unattractive additions to the lakefront. Evaporation from wet towers or spray canals arguably would be charged against Illinois' limited authority to divert water from Lake Michigan. Cooling ponds consume about two acres of land per megawatt, land that could be put to productive use.

The Board is agreed that, based on the above facts, the following alternatives are open to the Conference and to the Board.

A. Impose no limit on heated discharges to the lake. This alternative is wholly unacceptable, since unlimited proliferation of heat sources could very well have a very substantial detrimental effect on the ecology of the lake as a whole.

B. Outlaw all heated discharges to the lake, or all discharges above a given temperature (e.g., 1° or 5° above ambient), or above a given volume (e.g., 50 gallons per hour), with or without a grandfather clause. Such an approach would have the virtue of avoiding a later difficult and uncertain decision as to when the point of serious ecological risk is reached by a firm and early declaration that no significant thermal sources are to be allowed, and it would establish the position that not even a small percentage of the lake is to be sacrificed in the interest of inexpensive cooling.

C. Attempt to determine today the approximate thermal input that can be tolerated without harming the lake as a whole and without sacrificing undue percentages of the lake in the interest of inexpensive cooling, for example by limiting inputs to fifteen billion btu per hour within each twenty-mile stretch of lakeshore. This approach, while necessarily arbitrary in the same sense as is setting the voting age at 18 or at 21 years, has the advantage of attempting to avoid overall lake damage while accepting the argument that it is not worth millions of dollars to avoid making perhaps twenty acres uninhabitable by fish, and while allowing considerable use of a valuable natural resource, the cooling capacity of Lake Michigan.

D. Accept the Committee proposal to defer decision a few years in the hope that more complete information will be obtained, by placing the burden of proof on those discharging or planning to discharge heated effluents to show that their action will not cause ecological damage. This alternative preserves maximum flexibility to accommodate new knowledge, with a concomitant increase in uncertainty.

The Board has not yet reached agreement as among alternatives B, C, and D. With the help of arguments presented at the coming Conference sessions, we plan to take a vote on these alternatives within the next few weeks and to publish a proposed final draft of the new regulation during the first week in March. In any event, it seems highly likely that the Board will prescribe at least the following restrictions:

1. Neither the bottom nor the shore shall be affected by a new heated discharge of significant proportions.

2. No new heated discharge of significant proportions shall be located so as to affect spawning grounds or migration routes.

3. Discharge structures shall be so designed as to maximize short-term mixing and thus to reduce the area significantly raised in temperature.

4. No discharge of significant proportions shall exceed ambient temperatures by more than 20° F.

5. No new heated dishcarge of significant proportions shall interact with any other heated discharge of significant proportions.

6. Backfitting of alternative cooling devices will be required if significant damage is shown from existing or future heated discharges.

7. All reasonable steps shall be taken to reduce the number of organisms drawn into or against the intakes.

8. Physical, not chemical cleaning of condensers will be required.

The Illinois Pollution Control Board recognizes the desirability of uniform or compatible action by the four Lake Michigan states to preserve and to restore the quality of our common resource, and with this policy in mind we shall work toward a common standard that is strict enough to assure protection against significant lake degradation. It is our hope and expectation that the other states share this policy and that they will work toward the same goal of uniformity in such important areas as phosphate standards, in which the Illinois provision is currently far more strict than those of the other Lake Michigan states.

Yours sincerely,

David P. Currie

David P. Currie
Chairman

DPC:jc

cc: all conferees

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MR. STEIN: I know we can.

MR. CURRIE: They were sent to the conferees and to the Chairman of the conference on February 2.

MR. STEIN: I understand that. I am not sure that the conferees have these copies before them now. My guess is they don't. So if we are going to propose that as a working operation, I suggest we get those duplicated as rapidly as possible.

While that is being done, what do you want to do? Do you want to recess until that gets done, or do you want to see if we can proceed?

What is your view on that? Do you want to proceed on the findings, or do you want to wait for Mr. Currie's paper.

MR. PURDY: I have a copy of it now that I found in my files. I would like to take a moment to read it through.

MR. STEIN: I think you all have to have copies if we are going to follow this intelligently.

MR. PURDY: Does Mr. Frangos have one?

MR. STEIN: Do you have one, Mr. Frangos?

MR. CURRIE: We have sent someone to get additional copies of this. It should be back in 10 minutes.

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MR. STEIN: What do you want to do? All right. Now, let me ask you: What do you want to do? Do you want to proceed?

MR. PURDY: Let's recess for 10 minutes.

MR. STEIN: We will recess for 10 minutes.

(Short recess.)

MR. STEIN: Let's reconvene.

I think as this is coming in, I think that Mr. Purdy has a suggestion that we may be able to consider, and we will consider Mr. Currie's suggestion when it comes in.

Mr. Purdy, do you want to make your proposal?

MR. PURDY: Yes, on the first one that I offered, it has been pointed out to me that you can postulate an infinite number of plants and if you do so that certainly the lake — there is the possibility that the lake as a whole will not be warmed. So I would say that instead of "by the"-- if you would say "by powerplants," if you would say "by existing and presently proposed discharges from powerplants."

Then, in addition to that, to get something moving along in the way of findings, I would suggest that we — or I would offer those that Dr. Mount has offered in his statement on page 3 in the middle of that page — and he states that they are key points of concern regarding the temperature standards on Lake Michigan, and I would suggest that we look at those seven -- all of his findings.

MR. STEIN: I suggest, Mr. Purdy, that with your first one, why don't you read your whole package -- that shouldn't take more than a few minutes -- then we will get the idea and either we will consider it as a whole or in part.

MR. PURDY: Well, "First of all, that the lake as a whole will not be warmed except in localized areas by discharges of waste heat from existing and presently proposed powerplants.

Following that, "that safe lake temperatures vary with season and species -- that would be number 2.

"Third, heat is not persistent.

"Four, timing of food and fish hatching is precarious.

"Five, in the summer, Lake Michigan is a lake over a lake; the top one is much warmer than the bottom one.

"Six, maximum temperatures are not safe for long periods. Lethal temperatures must be related to time.

"Seven, mean temperatures must be lower than the maximums.

"Eight, that fish kill hazards are greatest in the winter."

MR. STEIN: All right, now, let's put that in abeyance for a bit.

Mr. Currie, would it be possible for us to have the package that you are proposing as findings now before the conferees?

MR. CURRIE: Would you like me to read them?

MR. STEIN: Yes.

MR. CURRIE: These are the fact findings of the Illinois Pollution Control Board on the basis of our four days of hearings and the five days of Federal workshop. They were sent to each of the members and the Chairman of the conference February 2, 1971.

"1. The area that would be raised in temperature more than 5° by the heated discharge from a 1,000 megawatt nuclear plant, designed so as to maximize dilution, could be limited to the order of 10 acres; the area raised 2° to the order of 100 acres.

"2. Such a plant could be built so that any given particle of water, or any organism, drawn through its condensers would be exposed to temperatures 20° above ambient for 2 minutes during passage, and any particle or organism discharged or entrained would be exposed thereafter to temperatures more than 10° above ambient for the order of

45 seconds, more than 5° for 6 minutes, and more than 2° for 1 and a half hours."

Those two findings, Mr. Chairman, are based on the uncontradicted testimony of Dr. Pritchard , which in my view withstood rather vigorous cross examination.

"3. A properly designed discharge structure can avoid any significant increase in temperature on the lake bottom or along the shore.

"4. The lake as a whole would not be perceptibly warmed by even a tenfold multiplication of present generating capacity on the lake with once-through cooling, if there were perfect mixing.

And that is very similar to the finding suggested by Mr. Purdy.

"5. Perfect mixing, however, is not possible. Consequently, if no limits are imposed the proliferation of electric plants along the lake may result in the warming by several degrees of a large fraction of the inshore waters, especially in the southwest portion of the lake."

I think it is important to make that point as well as the point that the entire lake as a whole is not likely to be affected.

"6. The interaction of two or more thermal plumes may have a more than linear effect on the area affected by

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a rise in temperature and on the residence time of any particle at elevated temperatures."

And that again is based on the testimony of Dr. Pritchard.

"7. A single 1,000 mw. nuclear plant will create a zone of a few acres uninhabitable by fish during the warmer months and unsuitable for spawning and other significant fish activities at various times."

That is based on the testimony of Dr. Raney who was a biologist testifying on behalf of Commonwealth Edison.

"8. Many, but an unknown percentage, of organisms passing through the condensers of such a powerplant will be killed or damaged by heat and by physical shock.

"9. A single large plant located in a spawning ground or across a migratory route would significantly disrupt the balance of the affected species throughout the lake.

"10. The residence time of algal cells in the heated plume from a properly designed single 1,000 mw. plant is too short to cause any detectable shift to less desirable species, and no increase in total algal mass is to be expected.

" 11. Unless it is located so as to interfere with spawning or migration, a single 1,000 mw. plant will have local effects as noted above but will not upset the balance of the lake as a whole.

"12. Unlimited proliferation of electric plants along the lake could seriously worsen the problem of nuisance algae by favoring the less desirable species and could seriously alter the balance of fish and other organisms in the lake as a whole.

"13. Various alternative methods of heat disposal are technically feasible, including wet and dry cooling towers, cooling ponds, and spray canals. The backfitting of all but dry towers is feasible.

"14. To backfit wet towers at the 2,200 mW. nuclear plant now under construction at Zion, Illinois, would cost somewhere from $15 million to $75 million; at a maximum this would cost residential customers each 69 cents per month.

"15. All alternative cooling means may have some undesirable environmental effects. Wet towers can cause fog problems; the Commonwealth Edison Company estimates fog from a wet tower on five to thirty mornings per year at Zion, usually in unpeopled areas. All towers discharge some polluted blowdown water that must be treated before release. Dry towers may cause as yet undetermined meteorological changes. Both wet and dry towers are bulky and unattractive additions to the lakefront. Evaporation from wet towers or spray canals arguably would be charged against Illinois' limited authority to divert water from Lake Michigan. Cooling ponds consume about 2 acres of land per megawatt, land that could be put to productive use."

Those, Mr. Chairman, are the findings of the Illinois Pollution Control Board, and I should like to move that they be made the findings of this Conference as well.

MR. STEIN: Well, may I ask just a point of clarification? Do you believe that this Conference has before it the information on which to base all of these findings?

MR. CURRIE: I certainly do, Mr. Chairman. All that evidence is in the record presented to this Conference during the 5 days of workshop last fall.

MR. STEIN: Right.

All right, now, let us — do any other of the conferees have findings to propose at the present time?

Well, I think we can do several things: 1) I think we can either take Mr. Purdy's proposed findings as a package; or 2) these findings as a package; or 3) if they are not mutually exclusive can put them together.

Now, I think when we talk in terms of findings, it possibly would be most productive to proceed one at a time and if we can proceed — let's start with the numbers. Mr. Purdy had eight, didn't you?

MR. PURDY: Yes.

MR. STEIN: And there were fifteen proposed by Mr. Currie.

Let us try this. Let's have your first one, Mr. Purdy.

MR. PURDY: "The lake as a whole will not be warmed except in localized areas by the discharges of waste heat from existing and presently proposed powerplants."

MR. STEIN: I suggest we take these all up. While there may be some of Mr. Currie's that come close with this, let's try to follow these through in order. Then if we have to do any editing later, after we have adopted then we could do it.

Are there any objections or any comments on that proposed finding by Mr. Purdy of Illinois? Would you accept that?

MR. MILLER: Were you asking Indiana?

MR. STEIN: Indiana. I am sorry. I was looking the wrong way. Indiana.

MR. MILLER: Yes, I would accept this.

MR. STEIN: The Federal conferee.

MR. MAYO: I missed the last of that statement.

MR. PURDY: "The lake as a whole will not be warmed except in localized areas by the discharges of waste heat from existing and presently proposed powerplants."

MR. MAYO: I have no objection to this.

MR. STEIN: The question is: Will you accept that as a finding?

MR. MAYO: Yes.

MR. STEIN: Right.

Illinois, do you accept that as a finding?

MR. CURRIE: Yes.

MR. STEIN: Wisconsin.

MR. FRANGOS: Yes.

MR. STEIN: Let's go on to No. 2, Mr. Purdy.

MR. PURDY: Safe temperatures in the lake vary with season and species.

MR. MILLER: I will accept this. Could we take all of these at one time or not?

MR. STEIN: Well, I will accept that. If this doesn't work we will go back.

Why don't you read them all and see if we can do it that way. That and the other six.

MR. PURDY: "Heat is not persistent. Timing of food and fish hatching is precarious. In the summer, Lake

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Michigan is a lake over a lake; the top one is much warmer than the bottom one. Maximum temperatures are not safe for long periods. Lethal temperatures must be related to time. Mean temperatures must be lower than the maximums. Fish kill hazards are greatest in the winter."

MR. STEIN: Do you agree with all of those?

MR. MILLER: I would accept these as findings.

MR. STEIN: Mr. Mayo.

MR. MAYO: Yes, I agree.

MR. STEIN: Mr. Currie.

MR. CURRIE: I agree with these.

MR. STEIN: Mr. Frangos.

MR. FRANGOS: If you are talking of taking judicial notice of those, yes. But would you repeat the one about the minimum and maximum? It is about 7 or 8, is it, Ralph?

MR. PURDY: "Maximum temperatures are not safe for long periods. Lethal temperatures must be related to time. And here again, in the editing, you might want to add "time of exposure," or something, but I think we understand the intent here."

MR. FRANGOS: Okay, very good.

MR. STEIN: Do you accept those?

MR. FRANGOS: Fine.

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MR. STEIN: All right. We are all agreed on those.

Now, let us turn to Mr. Currie for the presentation of No. 1. Do you want to present that, Mr. Currie, or do you want to propose that we handle them all together? The same way? What do you suggest? Mr. Currie, what would you suggest, that we do them all together or one at a time?

MR. CURRIE: My preference would be to do them all together, but I recognize that that might not meet with the approval of other conferees.

MR. STEIN: They may be complicated. What do you think?

MR. PURDY: Mr. Stein, well, I feel that many of these relate specifically to Illinois, and are not necessarily conclusions and findings or findings that we in Michigan are involved in.

MR. STEIN: All right.

MR. PURDY: And so, therefore, I am wondering what additions Mr. Currie feels would be necessary to those that have now been agreed to by the conferees.

MR. STEIN: All right. Would that be agreeable to you, in light of that comment, Mr. Currie, to indicate maybe going along which ones in addition to the ones we just adopted, and I think, Mr. Currie, I can sense this as well as you can, I think it will move faster if we take them one at a time for the time being and come up with any additions we think we should come up with.

MR. CURRIE: I think it is important, Mr. Chairman, that we make specific findings as to the area that is likely to be affected by a single plant. I think it is important that we have a thorough and complete record of the facts found by the conferees, and I don't think, therefore, that it is sufficient simply to say that the entire lake will not be raised in temperature and that the effects will be local without making some attempt to define what those local effects will be both in terms of the physical behavior of plumes and in terms of the effects of such a plume on organisms. And, therefore, it seems to me that the first finding is necessary. This is an attempt to delineate the area that we are talking about when we say that there will be local effects from a powerplant.

MR. STEIN: All right.

We have the first finding proposed. Are you prepared to comment on that, Mr. Mayo, or do you want to accept it?

MR. MAYO: This is item No. 1 at the bottom of the page.

MR. STEIN: Right.

MR. MAYO: As I understand the information on which this is based, Mr. Currie, they design so as to maximize pollution could be limited to the order of 10 acres. This "could," as I understand it, is based on the theoretical material that was presented by one of the experts -- Dr. Pritchard?

MR. CURRIE: That is correct.

MR. MAYO: Okay. I think if we would insert the phraseology "could, if the theoretical evaluation is correct, be limited to the order of."

MR. STEIN: Do you want to accept that amendment or not, Mr. Currie?

MR. CURRIE: Yes, that is certainly one of the assumptions on which this is based. It is also true that those theoretical assertions were uncontradicted in the record.

MR. STEIN: Mr. Mayo.

MR. MAYO: In what record?

MR. CURRIE: The record of the workshop of this Conference.

MR. MAYO: I think I would refer you to go back to the record.

MR. CURRIE: In what respect?

MR. MAYO: Review the testimony of that session on Wednesday evening.

MR. CURRIE: What is it you have in mind?

MR. MAYO: If the theoretical -- if this hinges on the correctness of the theoretical approach, I have no objection to this.

MR. STEIN: Let me say this: If the recollection of two of the conferees is different as to what the record is as to whether something was contested or not, I think this shows it.

Now, what I am trying to do is see if we can come to an agreement. Mr. Currie has made a proposal. There is a modification suggested by Mr. Mayo.

Will you accept Mr. Mayo's suggestion, or do you feel that that isn't appropriate?

MR. CURRIE: May I have the exact language?

MR. STEIN: Go ahead.

MR. MAYO: "...could, if the theoretical appraisal is correct, be limited to ..."

MR. MILLER: Whereabouts are we, now?

MR. STEIN: Well, let me read the whole thing, because the record isn't going to show this, and I think we better do that when we start each one.

It reads: "The area that would be raised in temperature more than 5° by the heated discharge from 1,000 megawatt nuclear plant designed so as to maximize dilution could be limited to the order of 10 acres, and the area raised 2° to the order of 100 acres."

And the recommendation that Mr. Mayo had for a change comes after the word "could."

Are we in agreement on the amendment to this?

MR. CURRIE: I would like to suggest one amendment to the amendment.

MR. STEIN: Yes.

MR. CURRIE: I would like it to read "... could, if the only theoretical appraisal in the record is correct, be limited ..."

MR. STEIN: Why don't we identify it by name?

By the way, I am making this from a public point of view to you people here. The difficulty is that we are not putting out something with cross references and it should be a self-contained document. Now, if you mean the record could -- if the theoretical appraisal made by Dr. Pritchard -- whatever his first name is -- of Johns Hopkins is correct, so people will know where to look when they read this instead of skating around when they have a document to discuss. And I say this just for purposes of clarification if that is what you mean.

MR. MAYO: I would not object to that.

MR. STEIN: Is that appropriate, Mr. Currie?

MR. CURRIE: It is fine that the finding identified Dr. Pritchard. I think it is also important that the finding specify that there was no contrary evidence in the record.

MR. STEIN: In other words, you want that to be stated here? As far as — now, as I understand this, do you agree, Mr. —

MR. MAYO: No. There was testimony presented by Mr. Callaway that was not in agreement with the theoretical explanation that Dr. Pritchard offered.

MR. CURRIE: How large an area did Mr. Callaway suggest would be affected?

MR. MAYO: I don't recall specifically what that was.

MR. CURRIE: I suggest that he made no such suggestion. I suggest that all Mr. Callaway said was that modeling is a species of witchcraft and I don't consider that to be a contradiction of the testimony that was presented,

MR. STEIN: Let me say this. As I understand it, I can see that we have a possible agreement if you and Mr. Mayo can get together on the language.

Do I take it — but I sense that if you say that this stands uncontradicted in the record, you and Mr. Mayo very probably will not come to an agreement.

Therefore, are you putting your proposal forward that without contradictions in the record or not at this point? Then I will poll the conferees.

MR. CURRIE: I would like to say "... could, if the only theoretical appraisal in the record is correct, be limited ..."

MR. STEIN: That is your proposal?

MR. CURRIE: And I am willing to insert parentheses saying "...(that of Dr. D. W. Pritchard)..."

MR. STEIN: If any of the other conferees want to speak up, you may.

MR. FRANGOS: Mr. Stein, isn't the awkward word here "could" and isn't that perhaps sufficient for the purposes of the finding?

MR. MAYO: Yes, but I think it is important at this point in time, Mr. Frangos, to identify the character of the material upon which that "could" is based and it is in fact theoretical.

MR. STEIN: Didn't he say that in his proposal?

MR. MAYO: Yes.

MR. STEIN: Right.

Well, let me get to this. How do you feel, Mr. Mayo, about the proposal that is made now?

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MR. MAYO: I have some question in terms of the limitation that's the only theoretical proposal because there was a great deal of material presented and discussed that Wednesday evening, that might fit the context of theoretic discussion of theoretical — theoretical consideration of alternatives other than that which Dr. Pritchard presented and I am more than willing to address ourselves specifically to the Pritchard concept.

MR. STEIN: Well, I think the key — and I am trying to resolve this — the problem comes down to the point of the word "only." Now, do you feel that that is essential to your statement here, Mr. Currie?

MR. CURRIE: Yes, I think without that we are not making any finding at all.

MR. STEIN: All right.

MR. MAYO: I will agree to Mr. Currie's presentation.

MR. STEIN: Okay. Let's have that language again so we can be certain we have it.

MR. CURRIE: "The area that would be raised in temperature more than 5° by the heated discharge from a 1,000 mw. nuclear plant, designed so as to maximize dilution, could, if the only theoretical appraisal in the record (that of Dr. D. W. Pritchard) is correct, be limited to the order of 10 acres, and the area raised 2° to the order of 100 acres."

MR. STEIN: Mr. Mayo, do you agree with that?

MR. MAYO: Yes.

MR. STEIN: Mr. Purdy?

MR. PURDY: Agreed.

MR. MILLER: Agreed.

MR. STEIN: Mr. Miller.

Mr. Frangos.

MR. FRANGOS: Agreed.

MR. STEIN: All right. Let's go to the second one.

MR. CURRIE: I would be happy to insert the same cautionary clause in the second one; it is based on the same testimony.

MR. STEIN: Why don't you read it as you would like to put it? I think that would be faster. I think we have to get this.

Would you read it the way you would like to see it put in? In light of the previous discussions, it may be the one that has the best chance of adoption most rapidly.

MR. CURRIE: "On the same assumptions made in paragraph 1, such a plant could be built so that any given particle of water, or any organism, drawn through its condensers would be exposed to temperatures 20° above ambient for 2 minutes during passage, and any particle or organism discharged or entrained would be exposed thereafter to temperatures more than 10° above ambient for the order of 45 seconds, more than 5° for 6 minutes, and more than 2° for 1 and a half hours."

MR. STEIN: Would you care to comment on that, Mr. Mayo?

MR. MAYO: You would embrace the same insert.

MR. STEIN: No, no, he had a phrase "... on the same assumptions as No. 1 ..."

MR. CURRIE: "On the same assumptions made in paragraph 1."

MR. STEIN: That that is the only testimony, the only theoretical point on it.

MR. CURRIE: Of course, we could incorporate this word for word and I would be happy to —

MR. MAYO: I would like to see it incorporated word for word.

MR. CURRIE: Fine.

MR. STEIN: Then let's get the exact language. Will you give us that again?

MR. CURRIE: All right.

"If the only theoretical appraisal in the record (that of Dr. D. W. Pritchard) is correct, such a plant --" and then it proceeds from there according to the text.

MR. STEIN: Is that agreeable?

Well, I am sorry. I am going to have to ask for a yes or no, not that I don't understand you, but it has to get on the paper.

Mr. Purdy.

MR. PURDY: Agreed.

MR. MILLER: Agreed.

MR. STEIN: Mr. Frangos.

MR. FRANGOS: Yes.

MR. STEIN: All right. No. 3.

MR. CURRIE: I would like to preface this one with the same "if" clause. "If the only theoretical appraisal in the record is correct"-- sorry, "If the only theoretical appraisal in the record (that of Dr. D. W. Pritchard) is correct, a properly designed discharge structure can avoid any significant increase in temperature on the lake bottom or along the shore."

MR. MAYO: Yes, no objection.

MR. STEIN: Yes. All right.

MR. PURDY: Agreed.

MR. MILLER: Agreed.

MR. FRANGOS: Yes.

MR. STEIN: Let's go on.

MR. CURRIE: No. 4, I think, has been adequately covered by Mr. Purdy's proposal.

MR. STEIN: All right.

MR. FRANGOS: Will that be added or deleted?

MR. CURRIE: I think this should be deleted.

MR. STEIN: All right. We won't consider it.

Go to the next one, No. 5.

MR. CURRIE: "No. 5. Perfect mixing, however, is not possible. Consequently, if no limits are imposed the proliferation of electric plants along the lake may result in the warming by several degrees of a large fraction of the inshore waters, especially in the southwest portion of the lake."

MR. STEIN: All right. Is that "southwest portion" -- is that "southwest portion" pertinent to all of the States here?

MR. CURRIE: I would be happy to omit that.

MR. STEIN: Put a period after "inshore waters"?

MR. CURRIE: Yes.

MR. STEIN: All right. Why don't we consider it that way, and I am making no judgment but I am looking for the applicability.

With that deleted, this reads: "Perfect mixing, however, is not possible."

Do we need that "however" there?

MR. CURRIE: I would be happy to omit the "however."

MR. STEIN: "Perfect mixing is not possible. Consequently, if no limits are imposed the proliferation of electric plants along the lake may result in the warming by several degrees of a large fraction of the inshore waters."

Mr. Mayo.

MR. MAYO: I agree.

MR. STEIN: Mr. Purdy.

MR. PURDY: Agree.

MR. MILLER: Agree.

MR. FRANGOS: Yes.

MR. STEIN: All right. Will you go on?

MR. CURRIE: Yes. No. 6 is again based on Dr. Pritchard's testimony, so I would like to preface it with the same following phrase: "If the only theoretical appraisal in the record (that of Dr. D. W. Pritchard) is correct, the interaction of two or more thermal plumes may have a more than linear effect on the area affected by a rise in temperature and on the residence time of any particle at elevated temperatures."

Dr. Pritchard made a special point about how intersection of plumes ought to be avoided for the reasons I have stated.

MR. MAYO: I don't think he was the only one that made that point.

MR. CURRIE: Then I would be happy to omit the qualifying phrase.

MR. STEIN: Well, without making a judgment here, I think the Federal presentation, as I heard it, talked about the overlapping of plumes -- and several others at the workshop. Would you want to submit that without the opening phrase?

MR. CURRIE: Yes.

MR. STEIN: All right.

Let me do this, for purposes of the record from now on, if we can keep moving. I am going to ask the conferees if there is any disagreement with this, and if there is, speak up. Otherwise, I would ask you to know that the recorder is going to record you as yes. Any disagreement with that?

MR. MILLER: None.

MR. PURDY: None on the part of Michigan.

MR. FRANGOS: No.

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MR. STEIN: Well, we might as well go through every one. That's all right.

MR. FRANGOS: No, I agree with that. I am sorry. That procedure.

MR. STEIN: I understand.

MR. CURRIE: "A single 1,000 mw. nuclear plant will create a zone of a few acres uninhabitable by fish during the warmer months and unsuitable for spawning and other significant fish activities at various times."

That one, Mr. Chairman, is based on the uncontradicted testimony of Dr. Raney and, of course, is supported as well by an abundance of Federal testimony.

MR. STEIN: Are there any comments on this without a modification, as it says — just a moment. I have a request for some discussion on this one.

MR. PURDY: Mr. Stein, I would just as soon omit that one as far as Michigan is concerned.

MR. STEIN: Right.

Do we have any comment from Indiana?

MR. MILLER: Well, I have problems with some of the words but --

MR. STEIN: In view of the suggestion of Mr. Purdy, Mr. Currie, do you want to omit this or —

MR. CURRIE: Certainly not.

MR. STEIN: All right.

MR. CURRIE: What are the objections?

MR. PURDY: I think that there will be certain species of fish that may find this particular zone to their liking and therefore it is not uninhabitable.

MR. CURRIE: That is a perfectly acceptable correction. "Uninhabited by certain species of fish."

MR. STEIN: Do you mean uninhabitable?

MR. CURRIE: Right.

MR. PURDY: Okay. Agreed now.

MR. MILLER: All right.

MR. MAYO: I have some question with the phraseology "a few acres." I feel that we don't have agreement on that point. I think if we were to strike just the words "a few acres" to "create a zone uninhabitable by certain fish during the warmer months."

MR. STEIN: Is that agreeable?

MR. MAYO: I think that "a few acres" is so subjective I don't know what it means.

MR. STEIN: Mr. Currie.

MR. CURRIE: I am not sure I understand the objection.

MR. STEIN: This would read — let me try this, maybe I can save time. "A single 1,000 mw. nuclear plant will create a zone uninhabitable by certain species of fish during the warmer months."

MR. CURRIE: No, I don't agree with that because I think one of the important points we should make here is that according to the record this is a small area, and this is based on -- well, again, perhaps we should incorporate the cautionary phrase that we started with because this, of course, is based on the assumptions as to the size of the plume.

MR. MAYO: Can we say "a small zone?"

MR. CURRIE: "A small zone?" Yes.

MR. STEIN: All right, then, let me read this again: "A single 1,000 mw. nuclear plant will create a small zone uninhabitable by certain species of fish during the warmer months, and unsuitable for spawning and other significant fish activities at various times."

Is that an agreeable proposal by you, Mr. Currie?

MR. CURRIE: Yes, it is.

MR. STEIN: Mr. Mayo?

MR. MAYO: Yes.

MR. STEIN: Without objection, we will say all of the conferees said "yes" on that.

Let's go on to the next one, Mr. Currie.

MR. CURRIE: "Many, but an unknown percentage, of organisms passing through the condensers of such a powerplant will be killed or damaged by heat or by physical shock," and the "and" should read "or."

MR. MILLER: Mr. Chairman.

MR. STEIN: Yes.

MR. MILLER: I wonder, since we don't know the percentage whether we should say "Many, but ..." or just say, "An unknown percentage of organisms passing through the condensers ..."

MR. CURRIE: That is acceptable to me.

MR. STEIN: Stop with "An unknown percentage ..."?

MR. MILLER: Yes.

MR. STEIN: All right. And the last "and" is changed to "or."

Any other changes?

MR. MAYO: I think we ought to take into account the chemical impact, the impact of chemicals added. So it might read "... would be killed or damaged by heat, physical shock or chemicals."

MR. CURRIE: That is acceptable.

MR. STEIN: All right.

MR. MILLER: We still have one other word that we are worrying about and this is in the second line. "Such a powerplant may be killed or damaged."

MR. STEIN: Instead of "will"?

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MR. MILLER: Instead of "will."

MR. STEIN: Okay, do you accept that?

MR. CURRIE: That is all right.

MR. MAYO: I would like to raise —

MR. STEIN: You are making all your findings with "could" and "may" — I think these words speak for themselves but that is up to the conferees.

MR. MAYO: I feel that there was enough material presented at the workshop session to speak clearly to the fact that organisms will be damaged.

MR. CURRIE: Well, I would prefer "will."

MR. STEIN: Would you accept "will"?

MR. MILLER: I will accept it.

MR. STEIN: Let me read it as we have it now.

"An unknown percentage of organisms passing through the condensers of"— can we strike "such" —"of a powerplant —"

MR. CURRIE: Yes.

MR. STEIN: "— of a powerplant will be killed or damaged by heat, physical shock or chemicals."

Without objection this will be adopted.

Mr. Currie, will you go on to the next one?

MR. CURRIE: "A single large plant located in a spawning ground or across a migratory route would"— and

I would like "would" to be changed to "could" —"significantly disrupt the balance of the affected species throughout the lake."

MR. STEIN: Is there any objection to that?

If I hear none, I will assume it is accepted.

Is that all right?

MR. MAYO: Just a moment.

MR. STEIN: We are not rushing. Go ahead.

MR. MAYO: Maybe I need to ask for some clarification. Is it intended that only if a plant is located in a spawning ground or across a migratory route there would be significant disruption?

MR. CURRIE: What I am suggesting is this is a special problem. We know that there is a very serious danger if a plant is located in such an area. I think we should make a special finding to that effect to emphasize the plants ought to be kept out of those areas, even if we cannot make a firm determination as to the effects of plants situated in other areas.

MR. MAYO: Okay. But would there also be an acknowledgment that plants situated at other locations could have a significant enough impact to disrupt?

MR. CURRIE: There is a finding to which we have already agreed that if there is a proliferation of plants, there is such a danger regardless of their location. I doubt that the conference can reach unanimous agreement on the further proposition that you suggest.

MR. MAYO: Well, I am willing to risk the hazard of not having unanimous agreement if, in fact, the point is substantive. I want to make sure that we are not ruling out the possibility that a plant — a single plant located at a point other than on a known spawning ground or migratory route could have a significant impact.

I don't think any of the presentations made to the Conference have been so exclusive as to say to the conferees that only those plants located in known spawning grounds or migratory routes are likely to have a significant adverse impact, and I would like to get some comment from other conferees on this point.

MR. STEIN: The floor is open.

MR. CURRIE: My own view, Mr. Chairman, is that there is not evidence to support the proposition that a single powerplant other than those located in the areas specified would have such effects.

I have submitted findings which have been approved already that delineate some of the effects that such a single plant would have, and I also would like us to make a special finding as to the special dangers of building plants in spawning and migration areas and I would suggest no finding on the other point.

MR. MAYO: Well, would you agree that there has not been a demonstration that single plants located in other than spawning grounds or migratory routes would not have a significant impact on the balance of the affected species?

MR. CURRIE: No, I would not agree with that.

MR. FRANGOS: Is there any place along the lake that is not at one time or another a migratory route --

MR. STEIN: Is there any answer to that?

MR. FRANGOS: -- for some species of fish that inhabit the lake?

MR. STEIN: Well, maybe we can ask Dr. Mount or one of the experts about this.

I think perhaps, Mr. Frangos, we could put this another way. Is there any place along the lake that we can safely say with advance prediction is not a migratory route? There might be some that are, but who is going to be the one to pick the spot and say it is not a migratory route? I don't know and I think maybe you are straining at something here which may or may not be too significant in the total operation.

What I am trying to see: Can we get agreement on the statement or not or don't you like the implication?

MR. MAYO: I don't like the implication.

MR. STEIN: Do you want to change that or do you want to reject it?

MR. MAYO: Let me have a moment to take a look at this.

MR. STEIN: Well, I think we better just proceed one at a time. Take your time.

By the way, I haven't been in any colloquy but looking at this myself, I will just throw this in as a legal draftsman that may assist us to get at it. If we broaden the statement and if we say "Plants" just generally or "Electric plants located in spawning grounds or across a migratory route could significantly disrupt the balance of the affected species throughout the lake."

I just throw that out as a possible kind of thing you may want to say.

MR. CURRIE: How about "Even a single large plant ..."?

MR. STEIN: Well, I don't object. They are looking for implications and I am trying to give you something to do that.

Let's wait. If that doesn't work, let's see what

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Mr. Mayo — how do you want to do this?

MR. MAYO: Mr. Stein, your suggestion would be acceptable. I want to reserve the opportunity to offer perhaps a companion piece —

MR. STEIN: All right.

MR. MAYO: — to this.

MR. STEIN: All right. Now, would that be agreeable to you if we said "Plants ..."?

MR. CURRIE: I am trying to make another point here, which is there are certain circumstances under which a single plant may be dangerous, and I think we ought to say that, and I don't see why one needs to read anything else into this. It might help, however, if I called attention now to paragraph 11, which does state very specifically the negative implications that Mr. Mayo opposes.

MR. STEIN: Well —

MR. CURRIE: It seems to me that is where we should fight the battle rather than on the wording of this one.

MR. STEIN: I know, but everyone has to make his own judgment, Mr. Currie, where he is going to fight his battle. I think this is Mr. Mayo's judgment.

The question here I have raised for you is that you can say "a plant" or "plants," it seems to me the plural sustains the singular in this kind of a finding or just as a drafting --

MR. MAYO: I think what I am concerned about can be addressed in item 11.

MR. STEIN: Do you want to leave this then?

MR. MAYO: Yes.

MR. STEIN: Now, let's see, as this reads now: "A single large plant located in a spawning ground or across a migratory route could significantly disrupt the balance of the affected species throughout the lake."

MR. MAYO: A technical point, Mr. Currie. This plant that is located across the spawning ground --

MR. STEIN: You mean discharges from a single large plant? Is that what you want to say?

MR. MAYO: It just isn't technically --

MR. CURRIE: That's fine.

MR. STEIN: All right. You've got what you want to say, let's say it. "Discharges from a single large plant located in the spawning ground or across a migratory route could significantly disrupt the balance of the affected species throughout the lake."

Are there any objections to this as this stands? If not, I'll assume you all say "yes."

Will you go on, please.

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MR. CURRIE: Paragraph 10 is an important one and again should be prefaced with the "if" clause that we attached to Nos. 1 and 2. I have been asked what is the basis for No. 10? It is based on the testimony of Dr. Pritchard as to residence time, as to which we have already adopted a finding, and on the further testimony of biologists that given that short residence time we are not going to have any detectable algae problems.

So that I will read it as amended: "If the only theoretical appraisal in the record (that of Dr. D. W. Pritchard) is correct, the residence time of algal cells in the heated plume from a properly designed single 1,000 mw. plant is too short to cause any detectable shift to less desirable species, and no increase in total algal mass is to be expected."

I should say, Mr. Chairman, that I view that as one of the most critical findings and that if I did not agree with that finding I might be sorely tempted to change my position on the backfitting of plants now under construction.

If we were really going to create a little algae factor at each one of these things where enormous masses of algae could break loose and float all over the shore and foul the beaches, then I think it might very well be worth $20 million to $40 million to avoid it. But I am convinced on the basis of the record that that will not be so, that there is a striking difference between a standing pool of water that would be created by a discharge of this magnitude into a small lake, and the kind of short-term residence of any given particle in the plume as it is mixed with lake water that would occur with a well designed plant discharging to Lake Michigan.

MR. STEIN: Are there any comments on this?

MR. MAYO: Yes, I have a couple of questions.

When you say — use the words "... too short to cause any detectable shift ..." are you talking about the lake as a whole or the small area?

MR. CURRIE: No, I am talking about the small area, and that was the only testimony in the record on that point, and I would be perfectly happy to preface that with the same "if" clause that we used before.

MR. STEIN: I thought that was your proposal.

MR. CURRIE: It was.

MR. STEIN: Thank you.

MR. MAYO: Well, we are concerned on two points: 1) the element of probability in the context of that presentation; and 2) the element of significance in any increase — and I would like to suggest that we insert in the second line between the words "is" and "too" the word "probably" — "... is probably too short ...".

MR. CURRIE: That is fine.

MR. MAYO: And after the word "no" in the third line "significant."

MR. CURRIE: That is also fine.

MR. STEIN: All right. Are these the only changes you have, or suggestions?

MR. PURDY: Mr. Stein, could I hear these again, please?

MR. STEIN: There is in the second line — "... is too short ..." — after "is", "... is probably too short ...", and then at the end of the third line "... and no significant increase ...".

Mr. Mayo.

MR. MAYO: This would be prefaced — what would the preface be again, Mr. Currie?

MR. CURRIE: "If the only theoretical appraisal in the record (that of Dr. D. W. Pritchard) is correct —"

MR. MAYO: Okay.

MR. STEIN: All right.

Now, let me read this with that preface: "The residence time of algal cells in the heated plume from a properly designed single 1,00 mw. plant is probably too short to cause any detectable shift to less desirable species, and no significant increase in total algal mass is to be expected."

MR. MILLER: You read "100 megawatt." You mean "1,000."

MR. STEIN: "A thousand." I am sorry.

Are there any objections?

That is even truer for 100.

If there are no objections, let's go on to 11.

MR. CURRIE: "Unless it is located so as to interfere with spawning or migration, a single 1,000 mw. plant will have local effects as noted above but will not upset the balance of the lake as a whole."

MR. STEIN: Mr. Currie, let me ask you a question on this: Is there a way in siting the plants that we can tell whether they are going to interfere with spawning or migration or not?

MR. CURRIE: I think that is an interesting question.

MR. STEIN: That is why I asked it.

MR. CURRIE: And I don't think it is fully answered in this record. There were a number of questions directed to various witnesses about where the spawning grounds were, and my assessment of the record is that nobody adequately answered that question.

MR. STEIN: Right. But, sir, I think you have the key to the case here. Although I disagree with your analysis, it seems to me, from hearing this from all sides, we maybe come up with the notion that if all these assumptions are true, and I think we get down to the key one here, that we don't really know whether we are going to site someplace that is going to interfere with spawning or migration or something else. The question is whether you apply a regulation to everyone and someone is going to figure this out sometime, or you are going to let the plant go in and then look around and see.

I just want to cite this here. The problem that I have is that I wonder how far these findings are going to get us, in order to come up with the solution when we get to it. I am just looking ahead a little.

Well, I think I have given the Federal people enough time to think about this. What do you think about the specific proposal, not what I just said?

MR. MILLER: I agree.

MR. STEIN: All these findings are great, but I think we have to come up with some conclusions based on them. I hope this is leading to that.

Do the Federal people want to say anything?

I think what I just said is the key to the whole case.

MR. PURDY: Is there a time limit for objections?

MR. STEIN: Well, we will give you 2 weeks, but --

MR. MAYO: I would like to suggest that we consider two insertions. To begin with, start the item out with "On the basis of information currently available ..." and in the last sentence instead of the word "will" insert the word "may."

MR. STEIN: Is that agreeable?

MR. CURRIE: I certainly agree with the first suggestion which I think improves the finding. I would like to be stronger than "may." I would suggest "is not likely to."

MR. MAYO: I wouldn't agree with that. I think the word "may" adequately assesses the information that is available to the conferees.

MR. STEIN: Can we get agreement on that?

MR. CURRIE: Not from me.

MR. STEIN: What?

MR. CURRIE: Not from me. I think that is a very important point.

MR. STEIN: All right.

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MR. CURRIE: If I thought there were a significant possibility that a single plant would damage the lake as a whole I would not have recommended the ultimate decision I have recommended.

MR. STEIN: Well, all right, now, we have got two propositions. I think we can read the first — what did you say,"on the basis of current information," or what?

MR. MAYO: "On the basis of information currently available."

MR. STEIN: "Currently available, unless it is located" — and so forth. We have two propositions, unless you have another one.

"Unless it is located so as to interfere with spawning or migration, a single 1,000 mw plant will have local effects as noted above but will not upset the balance" is one proposition — or "may not upset the balance of the lake as a whole."

I think what we will do is record the States on the findings here, if we can't get agreement.

MR. CURRIE: May I suggest, Mr. Chairman, that I would prefer to modify that so that it does not say "will not" but "is not likely to".

MR. MAYO: I don't agree with that.

MR. STEIN: Can we come to an agreement on this, or -- I tell you what I can do on this if you fellows want to do this. We can go through the rest of them -- we know what the issue is here -- and let's try going through the rest of these, and during the lunch recess if you can work out a formula you can agree on, I will poll the conferees. If not, I will present the two cases to them.

Let's defer that and go to 12.

MR. PURDY: Mr. Stein, before you move on, and if they are going to deliberate this during the lunch period, there is a thought that I would like to have them consider. And it seems to indicate in this sentence that the only local effects are those that have been delineated above, and there are other local effects that may have to be taken into consideration.

For example, along our western shoreline the ice shelf is important from the standpoint of protecting the shore line for erosion. There may be swimming beaches that are adversely affected, and so forth. And I wouldn't want that to be so limited.

MR. STEIN: Can we strike "as noted above"?

MR. CURRIE: I think that is an excellent suggestion. Could we say "...will have local effects some of which have been noted above."?

MR. STEIN: Will that satisfy you?

MR. PURDY: That is fine.

MR. STEIN: All right. I hope Illinois and the Federal people will be able to get together, and if you can work out a formula that you can both agree on, I will present it to the conferees or else I will poll the conferees on either of the alternatives you have proposed. Of course, they can give any alternates that they wish, any variance on that.

May we go to 12, sir?

MR. CURRIE: "unlimited proliferation of electric plants along the lake could seriously worsen the problem of nuisance algae by favoring the less desirable species and could seriously alter the balance of fish and other organisms in the lake as a whole."

MR. STEIN: Any problems with that from any of the conferees?

MR. MAYO: Could you strike the word "unlimited"?

MR. CURRIE: Yes.

MR. STEIN: Any other comments from the conferees?

If there are no other comments, let me read this: "Proliferation of electric plants along the lake could seriously worsen the problem of nuisance algae by favoring the less desirable species and could seriously alter the balance of fish and other organisms in the lake as a whole.

Unless I hear dissent --

MR. MAYO: I think there is a significant technical point here. This isn't the proliferation of electric plants, it is the proliferation of waste heat discharges from electric plants.

MR. CURRIE: That is correct.

MR. STEIN: All right. If you want to read it that way: "Proliferation --"

MR. CURRIE: I am glad, Mr. Chairman, I have all these lawyers here to help me.

MR. MAYO: I am not a lawyer, maybe that is why I am not being so much help.

MR. CURRIE: Well, I can say this improves the recommendation.

MR. STEIN: Well, I hope it does improve it. I guess when we write these there are certain phrases in the English language that describe certain grammatical structures, like hyperbole.

We will say "Proliferation of discharges from electric plants along the lake could seriously worsen the problem of nuisance algae by favoring the less desirable species and could seriously alter the balance of fish and other organisms in the lake as a whole."

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Without a dissent, I assume everyone is going to say yes to that.

No dissent. Will you go on?

MR. CURRIE: "Various alternative methods of heat disposal are technically feasible, including wet and dry cooling towers, cooling ponds, and spray canals. The backfitting of all but dry towers is feasible."

MR. STEIN: Are there any —

MR. MAYO: Excuse me, Mr. Chairman. In the previous item when you read it, you left out the term "waste heat" — "Proliferation of waste heat discharges ..."

MR. STEIN: All right. That may be amended to "... waste heat discharges ..."

MR. PURDY: I might ask Mr. Currie on "is feasible," is he reaching a conclusion that it is economically and technically feasible or technically feasible?

MR. CURRIE: Technically feasible.

MR. STEIN: Do you want to put that word in? Is that a suggestion?

MR. CURRIE: It is in the first sentence. Let's put it in the second as well.

MR. STEIN: "... is technically feasiblle."

Let me read it again: "Various alternative methods of heat disposal are technically feasible, including wet and dry cooling towers, cooling ponds, and spray canals. The backfitting of all but dry towers is technically feasible."

Any dissents? If not, we are assuming you all say "yes."

Let's go on to 14.

MR. CURRIE: Fourteen, I would like to amend from the written draft you have before you because as written it is too specific to one State.

The amended version is as follows: "To backfit wet towers at a single 2,100 mw. plant would cost somewhere between $20 million and $120 million. This would cost residential customers each somewhere between 10 and 69 cents per month."

Now, that does, I think, allow for considerable difference of opinion as to what the actual costs will be, and I think that is justified because we have some very conflicting assertions as to cost.

I think it is important, however, that we make some general statement of the range of values we are talking about so that the public knows that we are not talking about $1 billion for a single plant on the one hand, or about an inexpensive proposition on the other.

MR. STEIN: What did you say was the maximum?

MR. CURRIE: One hundred twenty.

MR. STEIN: No, no, no, I understand it. But in your last sentence, the maximum, you said, this "would" cost or "could" cost?

MR. CURRIE: Would cost somewhere between 10 and 69 cents. Those are the extreme estimates we have heard.

MR. STEIN: No, then you want the maximum don't you, out? If you are saying between 10 and 69, it doesn't read --

Mr. Currie, I just ask this, but do you mean that? Maybe the conferees are ready to make an economic judgment of what this is going to cost the customer each month, on the basis of what we have heard here. I don't know that we have had a rate hearing or cost hearing, where we are going to say what the minimum and what the maximum is. In light of the questioning, I think that I did, for clarification, and Mr. Purdy did in probing -- that as you get one or another of these plants going on, on the same system, that the costs are going to be cumulative, and this applies to all of the customers in the system as a whole.

I am not making any judgment here, but I raise with the conferees whether we have heard enough economic data to make a finding on cost. I might remind you that I think, from my point of view -- I won't speak for the rest of you people — but costs are outside my field of expertise in order to make a finding. Now, the other people may have that. I think costs are things we have to consider, but these are findings of a pollution conference.

MR. CURRIE: I think, Mr. Chairman, that in what you have said there is one very valid point, and that is that these costs per customer were based on a particular plant and its relation to its entire distribution system and therefore are not translatable to the general case. So I would like to omit that but retain the first part of the statement:

"To backfit wet towers at a single 2,100 mw plant would cost somewhere between $20 million and $120 million."

MR. STEIN: Now, we will ask the conferees to —

MR. MAYO: I want to get the words down so I can get them in the proper context.

MR. CURRIE: "To backfit wet towers at a single 2,100 mw plant would cost somewhere between $20 million —"

MR. MAYO: "Megawatt nuclear plant?"

MR. CURRIE: "Nuclear." Thank you.

"-- would cost somewhere between $20 million and $120 million."

MR. MAYO: Somewhere from —

Summary and Conclusions

MR. CURRIE: The 20 was the low figure mentioned yesterday — day before yesterday — by Mr. Tichenor, and the 120 was Commonwealth Edison's estimate.

The last sentence is omitted.

MR. MAYO: In terms of the monthly rate —

MR. CURRIE: Yes.

MR. MAYO: If what we are after here is to give a measure of the demonstration — demonstrate a measure of cost, then we have had those costs expressed in two contexts: 1) the cost to the company in terms of the $20 to $120 million. But I think it is also important to translate the range of that cost to the residential user.

MR. CURRIE: I think so, too.

MR. MAYO: And I think it is appropriate to leave in here the range of cost between 10 and 69 cents, because it is no less valid than the other comparison.

MR. CURRIE: I think the figures might be significantly different in regard to the costs to the individual customer if we were talking about all of the facilities of a given powerplant being backfitted.

In the case of Commonwealth Edison, we are talking about distributing the cost of backfitting one plant over the customers of a large number of plants. I would be very happy to leave in something about the amount it is going to cost the customer if we could make that generally applicable or if we could say that"in one case which has been studied by the conferees, the cost per customer ranged from 10 to 69 cents."

MR. PURDY: Mr. Currie.

MR. CURRIE: Yes.

MR. PURDY: Would you object to having: " At the Zion plant this would cost the residential customer somewhere between 10 and 69 cents per month?"

MR. CURRIE: Perfectly acceptable.

MR. MAYO: Okay.

MR. STEIN: All right.

Do you want to read that again, Mr. Currie?

MR. CURRIE: "To backfit wet towers at a single 2,100 mw nuclear plant would cost somewhere between $20 million and $120 million. At the Zion plant, this would cost residential customers each somewhere between 10 and 69 cents per month."

MR. CURRIE: Should we say then the "average" residential customers?

MR. STEIN: Yes.

MR. CURRIE: That is fine with me if it meets with approval.

MR. STEIN: All right. Why don't you read that again, because otherwise I think that may be subject to misinterpretation, Mr. Currie.

MR. CURRIE: Well, pursuant to the suggestion of the Chairman, the amended finding is as follows: "To backfit wet towers at the single 2,100 mw. nuclear plant would cost somewhere between $20 million and $120 million. At the Zion plant, this would cost the average residential customer somewhere between 10 and 69 cents per month."

MR. MAYO: Would you say "this is estimated to cost?"

MR. CURRIE: Yes.

MR. STEIN: All right, if we could change that. "This is estimated."

If there is no objection, we consider that accepted. Let's go to 15.

MR. CURRIE: There is a change in 15 as well but basically it is as written.

" All alternative cooling means may have some undesirable environmental effects. Wet towers can cause fog problems. All towers discharge some polluted blowdown water that must be treated before release. Dry towers may cause as yet undetermined meterological changes. Both wet and dry towers are bulky and unattractive additions to the lakefront. Evaporation"— well, let's leave the last sentence. Let's leave out the next sentence about evaporation. That is a peculiarly Illinois problem unfortunately.

"Cooling ponds consume about 2 acres of land per megawatt, land that could be put to productive use."

MR. FRANGOS: Mr. Chairman, I would suggest that perhaps we might want to delete a reference to the esthetics of a cooling device.

MR. CURRIE: It seems to me that is a very important consideration. One of the reasons that I am not so eager to jump into the backfitting of existing or under construction plants is because I think there are serious drawbacks to having large cooling towers on the lake, environmental problems, one of which is that they are just big and ugly and they don't belong on the lakefront if we can avoid it.

MR. FRANGOS: Well, I think the thing is so subjective that someone else may think you could design one that might very well be pleasing.

MR. CURRIE: Do you believe that?

MR. FRANGOS: Yes, I do.

MR. MILLER: I have had people tell me the ones at DuQuesne are pleasing.

MR. STEIN: Well, the suggestion that I get here is that you consider striking: "Both the wet and dry towers are bulky and unattractive additions to the lakefront?"

MR. CURRIE: How about "... bulky additions to the lakefront."? I don't think anyone would dispute their size.

MR. STEIN: All right. That is as close as we can get. Can we strike "unattractive"?

MR. MAYO: Could we say "less bulky additions than the Big John"?

MR. STEIN: No, no, no, no. (Laughter)

Let's see.

"Both wet and dry towers ..." — let's see — you are ready to say strike "unattractive."

"Both wet and dry towers are bulky additions to the lakefront." Now, do you want to leave that in?

MR. CURRIE: Yes.

MR. STEIN: Is that acceptable, Mr. Frangos?

MR. FRANGOS: He is insisting on "bulky"?

MR. STEIN: That is a color word.

MR. FRANGOS: Okay, fine. I think that is agreeable.

MR. STEIN: All right. Now, are there any other suggested changes here?

MR. PURDY: Mr. Stein.

MR. STEIN: Yes.

MR. PURDY: To my knowledge, at least I don't know that I have reached a conclusion that the blowdown water from the towers must be treated before release. Possibly they need to be controlled in some fashion, but to indicate at this point in time that they must be treated, I don't know as I am ready to agree to that.

MR. STEIN: Would you suggest "control" there or what?

MR. CURRIE: How about "...that may require treatment before release"?

MR. PURDY: Okay.

MR. MILLER: Mr. Chairman.

MR. STEIN: Wait a minute.

MR. MILLER: Okay.

MR. STEIN: All right.

MR. MILLER: When you get down to the last sentence that is that "Cooling ponds consume about 2 acres of land per megawatt, land that could be put to productive use," I don't know whether that would always be necessarily true, that "...could be put to productive use."

MR. CURRIE: Let's omit everything after the comma so that this reads: "Cooling ponds consume about 2 acres of land per megawatt."

MR. STEIN: That is fine.

Any other comments?

MR. MAYO: Yes.

It appears that there may be opportunities, if you have the right water conditions, that there is not going to be polluted blowdown from towers under certain circumstances. So that the word "all" seems to be inappropriate. If we could find --

MR. MILLER: I think we had testimony at the 5 days of hearing and I certainly would concur with the use of the water around Lake Michigan that you are going to have blowdown.

MR. STEIN: No, the question here is, Mr. Miller, whether all towers discharge polluted blowdown water. Again, I am not making a judgment, but you have the phrase "All towers discharge some polluted blowdown ...".

Now, the contention is that every tower does not necessarily have to discharge polluted blowdown water. I don't know what the validity is, but I do know that at least in a formal logic course you have a pretty strong statement here when you say "All towers discharge some polluted blowdown water" and if that is what you mean you should state it.

MR. CURRIE: "... towers are likely to discharge polluted blowdown water ..."?

MR. STEIN: What do you want to say?

MR. CURRIE: "... towers are likely to discharge ...".

MR. STEIN: Is that agreeable?

All right. Say, "Towers are likely to discharge ..." -- do you want to strike the "some polluted blowdown water" -- or not -- or "some"?

MR. PURDY: Can we get away from some of this hangup, Mr. Stein, by just leaving out the "polluted." That "towers discharge blowdown water that may require treatment before discharge?"

MR. STEIN: Yes. Is that agreeable? "Towers discharge blowdown water that may require treatment before discharge?"

MR. CURRIE: That is all right with me.

MR. MILLER: All right.

MR. STEIN: All right. That will be: "Towers discharge polluted blowdown water -- "

MR. PURDY: Not "polluted."

MR. STEIN: No. "--discharge blowdown water that may require treatment before release." All right. Are we all set?

Summary and Conclusions

Any other comments? Yes.

MR. MAYO: I have reservations about the end of the last sentence. When we say, "Cooling Ponds consume about 2 acres of land per megawatt, land that could be put to productive use" —

MR. STEIN: No, we put a period after "megawatt."

MR. MAYO: Okay, fine. Thank you.

MR. STEIN: Let me be brave and try this. Are there any other comments before I start? These delayed reactions hold me up, fellows. Do you have any more on this?

Let me read this, and I hope I am not rushing you too much.

"All alternative cooling means may have some undesirable environmental effects. Wet towers can cause fog problems; the Commonwealth Edison"—

... Cries of "No, no" ...

MR. STEIN: I am sorry. Go ahead. Correct me.

MR. CURRIE: "Towers discharge blowdown water"—

MR. STEIN: "Wet towers can cause fog problems." And then we strike.

"Towers discharge blowdown water that may require treatment before release. Dry towers may cause as yet undetermined meteorological changes. Both wet and dry towers are bulky additions to the lakefront. Cooling ponds consume about 2 acres of land per megawatt."

Without objection, I assume we all approve that.

Now, before we recess for lunch, when we come back from lunch we will take up No. 11. I ask that the Illinois and the Federal conferee and their staffs get together and strive with might and main, if you can, to come up with a formula we can propose. Then I am going to put the alternates out for the conferees. We are not limited just to voting on the alternates. You may come up with any variation you want if you don't like these.

In addition to this, these conclusions are not locked up yet. That is, if you want to, you can have more, or if you want to have a second thought on any of these, come back and we will reconsider them. But I ask you in the name of humanity to keep the last thing to the minimum.

With that — now, let's see if we can come back in an hour and a quarter. Let's try a quarter to 2:00. Okay? We recess until a quarter to 2:00.

(Noon recess.)

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Summary and Conclusions

AFTERNOON SESSION

Executive Session, Continued

MR. STEIN: Let's reconvene.

I would like to check. I think we were talking about Finding No. 11 — and I am just using this number for identification purposes. This won't be what it comes out as because we have had eight before this, but it is No. 11 in the letter that Mr. Currie had sent.

Now, have the Federal and State people come to an agreement? If not, will Mr. Currie make his proposal? If you have, will you announce the agreement?

MR. CURRIE: Well, Mr. Chairman, we spoke about this over the lunch break, and there does seem to be a difference of opinion between us and the Federal conferee on this point.

I would like to suggest one possible alternative for consideration. On the basis of information currently available, unless it is located so as to interfere with spawning or migration, a single 1,000 mw plant will have local effects some of which have been noted above but we cannot predict that it will upset the balance of the lake as a whole.

MR. MAYO: We cannot predict that it will upset?

MR. CURRIE: Yes.

MR. MAYO: I think we are back where we started because I would feel obliged to say we cannot predict that it will not upset the balance of the lake, or may not upset the balance of the lake.

MR. STEIN: Well, unless you can come to an agreement with me, we have a proposal on the way you want it stated, and may we have counter proposals — and I will put all of the proposals — or any of the States can have the modification of that. What is the finding that Illinois would like to make on this point, Mr. Currie?

MR. CURRIE: "On the basis of information currently available, unless it is located so as to interfere with spawning or migration, a single 1,000 mw plant will have local effects as noted above but is not likely to upset the balance of the lake as a whole."

MR. STEIN: All right. Would the Federal Government conferee like to make a recommendation on that point or do you have an alternate, or do you want to associate yourself with it?

MR. MAYO: What was that last — "not likely to"?

MR. CURRIE: Yes.

MR. MAYO: I would like to suggest some different language and say, "... but the effect on the balance of the lake as a whole is not known at this time."

MR. CURRIE: I think I prefer your earlier language about "may not affect," if we have to make a decision on that basis. I think we could all agree that it may not affect the balance of the lake as a whole, and I would prefer to see the conferees make a stronger statement, but I am willing to go along with what you earlier suggested as something as to which all of us can agree.

MR. STEIN: I think I am going to exercise the prerogative of the Chairman because I see a chance of agreement. If we strike out "will" and make it "may," are both of you people in agreement on the proposal?

MR. CURRIE: Fine with me.

MR. MAYO: No.

MR. STEIN: Not yet?

MR. MILLER: That is what he said before lunch.

MR. MAYO: Well, that was before lunch, Perry. (Laughter)

I feel that seriously the substance of this recommendation is a focal point of our whole consideration this morning and is not to be taken lightly.

I would suggest the alternate language that would read: ... but the effect on the balance of the lake as a whole is not known at this time."

MR. STEIN: Can we reach agreement on that? If not, I am just going to have to move.

MR. CURRIE: No, I don't think that meets with the findings of our Board.

MR. STEIN: All right, I am going to ask you again -- and I would ask the other conferees to listen, in case any of the other conferees want to put in a proposal -- I am going to ask Illinois to put forth its recommended finding; I am going to ask the Federal conferee to put forth his Federal finding; and then I am going to poll the other conferees and see if they want to associate themselves with either finding, have an alternate, or remain silent on this point.

Mr. Currie, may we have your conclusion?

MR. CURRIE: "On the basis of information currently available, unless it is located so as to interfere with spawning or migration, a single 1,000 mw plant will have local effects some of which have been noted above but may not upset the balance of the lake as a whole."

MR. STEIN: Mr. Mayo.

MR. MAYO: We would propose and agree that: "On the basis of available information, unless it is located so as to interfere with spawning or migration, a single 1,000 mw plant will have local effects some of which have been noted above but the effect upon the balance of the lake as a whole is not known at this time."

MR. STEIN: All right.

Mr. Purdy.

MR. PURDY: I concur in the Illinois wording.

MR. MILLER: I will concur in the Illinois wording.

MR. STEIN: Wisconsin.

MR. FRANGOS: I will concur with the Federal wording.

MR. STEIN: That's a nice balance. (Laughter)

Are there any other findings which you think should be appropriate other than the ones we have considered?

MR. MAYO: Yes. I have some additional findings, Mr. Chairman.

MR. STEIN: Mr. Pratt --

FROM THE FLOOR: May we have the additional findings, please?

MR. STEIN: The Chairman has trouble getting them.

Let's continue.

MR. MAYO: There are several additional findings that we would like to have the conferees consider, Mr.

Chairman, and each has a copy.

The first is, and I quote: "The existing federally-approved water quality standards to control waste heat discharges do not offer adequate protection for the waters of Lake Michigan and its continued beneficial uses."

I think it is important at this juncture to recognize that while there are federally-approved standards for three of the States, the standards were approved, I think, back in about 1968, that in the face of the information now available to the conferees, that this is a reasonable finding.

MR. STEIN: Any discussion?

MR. CURRIE: Mr. Chairman, I think that is a very important point. I agree with it 100 percent.

MR. STEIN: Any other discussion?

Now, let's start at the other end of the table. Mr. Frangos, how do you vote on this one?

MR. FRANGOS: That is fine. Yes.

MR. STEIN: Mr. Currie?

MR. CURRIE: Yes.

MR. STEIN: Mr. Mayo?

MR. MAYO: Yes.

MR. STEIN: Mr. Miller?

MR. MILLER: Yes.

Summary and Conclusions

MR. STEIN: Mr. Purdy.

MR. PURDY: In the unique position of not having federally-approved water quality standards, I have no objection.

MR. STEIN: Can we say it is a yes vote?

MR. PURDY: It is a yes vote.

MR. STEIN: All right. Go on.

MR. MAYO: The next finding: "The effective management of waste heat discharges into Lake Michigan makes it desirable for the States to adopt reasonably uniform water quality standards."

MR. STEIN: Any discussion?

MR. CURRIE: Yes, Mr. Chairman. I think that the important qualifications should be made that I believe someone raised earlier that what we want to be uniform are minimum standards and that any State may impose higher requirements if it so desires.

MR. STEIN: That is true. I think it is clear that our law provides that.

Do you want to make a special point in this here?

MR. CURRIE: I think insert the word "minimum" after "uniform."

MR. STEIN: Is that okay with you?

MR. MAYO: Yes.

MR. STEIN: Is that all right? Any other discussion? All right.

Now, let me go along this way. Again, we have a request that these be made available to the people who are here.

MR. CORRADO: They are making up more copies now. They will be down as soon as possible.

MR. STEIN: This reads: "The effective management of waste heat discharges into Lake Michigan makes it desirable for the States to adopt reasonably uniform minimum water quality standards."

Do I hear an objection to that? If not, I consider all of you said "yes." Let's go on.

MR. MAYO: The next item — the next finding: "The evidence presented to the Conference does not permit a determination of the overall damage of large waste heat discharges to Lake Michigan from existing or planned power generation plants."

MR. CURRIE: I would take issue with that, Mr. Chairman. I think I could accept a modification of it that would read as follows: "The evidence presented to the Conference does not permit a quantification of the overall damage of large waste heat discharges to Lake

Michigan from any particular number of planned power generation plants."

I think we know a great deal about the effects of waste heat on Lake Michigan. I think we do not have full information as to quantification.

MR. MAYO: But do you feel that quantification extends to the overall ecological impact, or that that quantification is really fairly specific?

MR. CURRIE: I am not sure I understand the question.

MR. MAYO: Well, do you feel that we are lacking only quantification on the overall damage? Say that again the way you had it.

MR. CURRIE: "The evidence presented to the Conference does not permit a quantification of the overall damage of large waste heat discharges to Lake Michigan from any particular number of planned power generation plants."

MR. MAYO: How about "existing?"

MR. CURRIE: Well, there you see I think we may have a disagreement. I think the evidence is fairly clear that there is no substantial harm done to the lake by existing powerplants.

MR. MAYO: This presumes that all of the important parameters that need to be examined have been considered and have, in fact, been examined, and I would have to disagree on that point.

MR. STEIN: All right, then, let's have your proposal.

MR. MAYO: I think that what Mr. Currie has suggested would be all right with me if we leave in the word "existing."

MR. STEIN: Mr. Currie.

MR. CURRIE: I think I would agree with the proposal that way, if it said something about the "Conference will reasses the effect of large waste heat discharges from existing or planned power generation plants in the light of future evidence."

I think that on the basis of the evidence we have before us we can be fairly confident that there is no serious harm from existing powerplants. But I do think we ought to make it clear that we expect to reasses that on the basis of future evidence.

MR. MAYO: Will you write out what you have —

MR. CURRIE: "The Conference will reasses the overall damage of large waste heat discharges to Lake Michigan from existing or planned power generation plants in the light of future — additional future evidence."

MR. MAYO: You would offer that as a substitute for what you —

MR. CURRIE: Yes, I would.

MR. MAYO: I would accept that in addition to what I have said.

MR. STEIN: Let me see if I can have a clarification, Mr. Currie.

If your contention is that there is no damage from existing plants that has been demonstrated, and we are going to reassess it, then if we adopt these findings,it would seem to be more or less the point of the conclusion that the Federal people and others are going to agree that they are not going to ask for any backfitting until there is a reassessment.

MR. CURRIE: Well, that, of course, would be what I would recommend to the Conference.

MR. STEIN: That is right and if that is what the Federal people want to do, let's go ahead.

MR. MAYO: I would have to stick with the — or offer the finding as it stands.

MR. CURRIE: Well — and I would have to dissent.

MR. STEIN: All right, then, let's go on.

The finding says: "The evidence presented to the Conference does not permit a determination of the overall damage of large waste heat discharges to Lake Michigan from existing or planned power generation plants."

Either signify you agree; you don't agree; you don't want to associate yourself with it; or you have a substitute.

Mr. Purdy.

MR. PURDY: I would like to omit this one.

MR. STEIN: All right.

MR. MILLER: I think I would just as soon omit it.

MR. STEIN: Mr. Currie.

MR. CURRIE: I agree with Mr. Purdy.

MR. STEIN: Mr. Frangos.

MR. FRANGOS: Let's omit it.

MR. STEIN: Do you still want to keep this in?

MR. MAYO: I would like it to show that as far as the Federal conferee is concerned.

MR. STEIN: All right. This will show. Go on.

MR. PURDY: Mr. Stein, yesterday I kept quiet all day on one particular point. It seems to me that this weakens our position quite a little bit and, in fact, as I listened to the "Today" show yesterday and heard Senator Buckley defend the Administration position, including that of the Environmental Council, with matters relating to the

SST, we had to move forward on the SST so that we could have some good hard facts and determine the overall damage that might be caused by this; and I think this one weakens our position to state it in this fashion.

It seems to me — if this represents Administration position it seems to be 180° opposite from that taken with respect to the SST.

MR. MAYO: Well, I would have to offer the rejoinder, Mr. Purdy, that responsible people have to follow their convictions.

MR. PURDY: Okay.

MR. STEIN: All right. We have this.

Let me clarify something for the record. This presents the finding recommended by the Federal conferee. I think when the Administrator acts on this we can be reasonably assured we would have the Federal position.

Let's go on.

MR. MAYO: The next suggested amendment or addition to the item No. 8 in the findings that Mr. Currie offered —

MR. MILLER: What is this now?

MR. MAYO: No. 8.

MR. MILLER: Of which set?

MR. MAYO: Of Mr. Currie's.

Summary and Conclusions

MR. STEIN: Eight reads, as I have it — check me if I am wrong, because I am working from notes here — "An unknown percentage of organisms passing through the condensers of a powerplant will be killed or damaged by heat, by physical shock, or chemicals"— period — or maybe semicolon —"Therefore, the damage is likely to be proportional to the volume of water intake."

That is added to the end of the proposal.

MR. MAYO: Yes.

MR. CURRIE: That is fine with me. It is also proportional to a number of other things, of course.

MR. STEIN: Are there any other comments?

Mr. Purdy.

MR. PURDY: Okay.

MR. STEIN: Okay.

MR. MILLER: Okay.

MR. STEIN: How about Mr. Frangos?

MR. FRANGOS: May we strike "therefore"?

MR. STEIN: What do you think about that? Start a new sentence with "Damage."

MR. MAYO: I like "Therefore" for the continuity of thought.

MR. FRANGOS: Let's strike it.

MR. STEIN: Do we get agreement on that or not?

MR. FRANGOS: Okay, leave it in.

MR. STEIN: Okay. Let's go. Next one.

MR. MAYO: The next one is a suggested addition to Mr. Currie's item No. 5 which I think makes the statement more correct. We add that after the word "proliferation" -- "... proliferation of waste heat discharges from electric plants ...".

MR. STEIN: All right. Here is the way — let me read the whole thing: "Perfect mixing, however, is not possible. Consequently, if no limits are imposed, the proliferation of electric plants along the lake may result in the warming by several degrees of a large fraction of the inshore waters especially in the southwest portion of the lake."

This would read, with the proposed amendment: Consequently, if no limits are imposed, the proliferation of waste heat discharges from electric plants along the lake may result"-- and so forth.

MR. CURRIE: That is fine.

MR. PURDY: Good.

MR. STEIN: Are there any objections? If not, we will accept this.

MR. MAYO: If I recall, Mr. Chairman, the earlier agreement stopped after the words "inshore waters."

MR. CURRIE: Yes.

MR. STEIN: Yes, that is correct.

MR. MAYO: The next recommended finding is as follows: "The behavior of waste heat plumes during winter months is substantially unknown and therefore the impact on the ecology of Lake Michigan is not now assessable."

MR. CURRIE: On that one, Mr. Chairman, I sympathize with the thought. I recall that substantial questions have been raised as to the different behavior of plumes in the wintertime, particularly with respect to their sinking and rising under different temperature conditions. So I would agree to this with a small modification to read as follows: "Additional evidence is desirable as to the behavior of waste heat plumes during winter months and as to their impact on the ecology of Lake Michigan."

MR. STEIN: Do you accept that?

MR. MAYO: No, I would prefer to take what we have here as "not now assessable" and "Additional evidence is desirable."

MR. CURRIE: The reason for my suggested amendment is that I would not like to suggest that we are in no position to make any kind of decision on this. I think we know enough about it to make a tentative evaluation of it subject to correction in the light of later additional evidence. So if you wanted to say: "Additional evidence desirable and the impact is not now fully assessable" or "finally assessable," I would agree.

MR. MAYO: Could we write that down?

MR. CURRIE: "Additional evidence is desirable as to the behavior of waste heat plumes during winter months. Their impact on the ecology of Lake Michign is not now fully assessable."

MR. MAYO: Okay.

MR. STEIN: The word "ecology," we are advised by our biological experts — scientists — that the word "ecology" should be changed to "ecosystem."

All right. Are there any objections to that? If not, let's go on. Let's go on with the next one.

MR. MAYO: The final recommendation for the finding is one that I would hope we have no disagreement on. It is as follows: "It is the established policy of the regulatory agencies parties to this Conference that pollutants shall not be discharged to public waters until there is firm understanding of the detrimental effects of such discharges."

MR. CURRIE: Mr. Chairman, again, I think the additional one word would make that not only agreeable to me but very definitely desirable, and the word is "reasonably," and it should be inserted before the word "firm," so that it reads "... until there is reasonably firm understanding of the detrimental effects of such discharges.".

I am afraid that the proposed form without that amendment suggests that we must put a stop to a large number of human activities until there is the kind of conclusive proof which I believe you will never have on any subject.

MR. MAYO: I would agree.

MR. STEIN: Are there any other comments? Are there any objections to this?

MR. FRANGOS: I have a question. What is the purpose of this finding?

MR. MAYO: I think it is intended on my part, on the Federal part, to put into perspective the sense of responsibility for the agencies, the parties to the Conference, simply stated as such.

MR. STEIN: Are there any questions?

MR. MILLER: Mr. Chairman, I have some question here. Here it says"it is the established policy of the regulatory agencies,"and this would imply that it is already an established policy.

MR. STEIN: That is the finding that it makes here.

MR. MILLER: And this may present some difficulty.

The other factor would be that I wonder how much different this is than the antidegradation policy we have already included in the standards that we have approved.

MR. MAYO: I was not intending to reinterpret any of the standards. I was intending to put into the findings, state very straightforward a statement of the sense of responsibility of the agencies party to the Conference.

MR. MILLER: I think unless we accept the antidegradation, that we are then saying today as conferees we are establishing a policy for the regulatory agency, and I don't know whether I can do that or not.

MR. MAYO: Could we say it is the already established policy?

All I am trying to relate this to, Perry, is the sense on my part that, as regulatory agencies, we are already committed to this sort of thing.

MR. MILLER: Well, that is partly my point. I think we have already done this by the antidegradation clause that we have so maybe —

MR. STEIN: What are you suggesting, Mr. Miller, that we don't need this?

MR. MILLER: I wonder if we need it.

MR. STEIN: What do you think?

MR. MILLER: Well, I think that we already have it in Indiana.

MR. STEIN: That is the way I read what this says, that you have it in Indiana. It makes a finding of what you have as your established policy of Indiana, and you are concurring.

I think the question -- maybe we can clarify the language. It is not so much what it says, but Mr. Miller raises the question of whether this is needed.

MR. MAYO: Well, if the conferees feel this is a redundancy, I will withdraw it.

MR. STEIN: Well, will you withdraw it?

MR. MAYO: I would like to hear from them, if I may, whether they think it is a redundancy.

MR. FRANGOS: Well I do. I don't think it is adding anything to the process. If you would like it for the record, please to agree that it is indeed the policy of the Wisconsin Department of Natural Resources, that pollutants shall not be discharged to public waters until there is a reasonably firm understanding of the detrimental effects of such discharges.

MR. STEIN: Mr. Mayo.

MR. MAYO: Well, I will withdraw it if it is the general consensus it is redundant.

MR. STEIN: Are there any other findings that you want to make before we go on to the recommendations?

I would like to make one other observation here from the Chair. I think this conference has done one thing, and we have had a lot of conferences and a lot of conference sessions. We have broken the all-time record for findings. I guess you exercised your best judgment. But it remains to be seen whether extensive findings of this kind and findings which, in many measures, are qualified conditions, including some which are hara-kiri in nature and cover page after page, are going to form a firm basis for decision and whether they might not form hooks as a refuge for people who don't want to comply or can point to something to buttress their case. I think we are going to have a very interesting time but I commend you on your efforts.

MR. CURRIE: If I may make an observation, Mr. Stein, I think that we have made a substantial step forward by adopting specific findings, so that we know and the public knows what the facts are on which we base our decision.

I think it obvious at this point that reasonable men can differ and very likely will differ as to what policy conclusions should be drawn from these factual findings. And with that in mind, I would like to move that the following recommendation be made by this conference as its sole recommendation.

Recommendations

MR. CURRIE: The recommendation is the following: "Limitation should be placed on large volume heated water discharges by requiring closed cycle cooling systems using cooling towers or alternative cooling devices on all new powerplants not yet under construction."

MR. STEIN: Are there any comments on that?

MR. MILLER: He makes this as the sole --

MR. STEIN: The sole recommendation.

MR. CURRIE: I would be happy to take a vote on this as a recommendation because I think, judging from the comments that have been made so far by all conferees, that this is one matter and one most important matter on which all of the conferees should be able to agree.

I think we all agree that we do not want proliferation of new nuclear powerplants without alternative cooling devices around the lake. I think it imperative that the conference go on record to that effect by drawing that firm line today. And my recommendation is drawn almost word for word from the communication to the conferees by Administrator Ruckelshaus except, of course, that I have limited it to plants not under construction.

MR. STEIN: Well, I think it is going to be significant whether we make this a sole recommendation. Your proposal is for a recommendation, as a sole recommendation. Do you want to clarify that of how you want me to put this forward?

MR. CURRIE: I move that the Conference make the recommendation which I have suggested.

MR. STEIN: But you are not limiting this to be the sole recommendation?

MR. CURRIE: No.

MR. STEIN: Now, let me -- one clarifying point: What do you mean by "plants under construction"? What's the line on that?

MR. CURRIE: Plants as to which no construction work has been done as of today's date.

MR. MAYO: Mr. Chairman, I want to raise a point of order. Generally we don't get involved in parliamentary problems in connection with motions that are made, and I don't want to set any precedents here that lead us down a future path of controversy.

I would like to offer, at this point, if I may -- and if it is parliamentarily correct -- a substitute for Mr. Currie's motion.

MR. STEIN: Well, if we are going this way, we are going this way. If you want to, I think we are going to -- you are perfectly privileged to do this, and you can offer an amendment or a substitute at this time and we will consider both. Go ahead. Why don't we put this on the table?

MR. MAYO: I would like to offer as a substitute for Mr. Currie's motion the full package of the recommendations that were laid on the table by the conferee at the beginning of the Executive Session with the following amendment --

MR. STEIN: You know, this is so far away in the record, I am going to have to ask you to do as Mr. Currie did -- to read your entire language, so it is going to be comprehensible to anyone who reads the record.

MR. MAYO: Okay. "In order to protect Lake Michigan the following controls for waste heat discharges are recommended by the conferees. Municipal waste and water treatment plants, and vessels are exempted from these recommendations.

"I. Applicable to all waste heat discharges except as noted above:

"1. At any time, and at a maximum distance of 1,000 feet from the point of discharge (agreed upon by the State and Federal regulatory agencies) the receiving water temperature shall not be more than 3° F. above the existing natural temperature nor shall the maximum temperature exceed those listed below whichever is lower:

Recommendations

	Surface 3 feet
January	45°
February	45°
March	45°
April	55°
May	60°
June	70°
July	80°
August	80°
September	80°
October	65°
November	60°
December	50°

"2. Water intake shall be designed and located to minimize entrainment and damage to desirable aquatic organisms. Requirements may vary depending upon local situations but, in general, intakes are to have minimum water velocity, shall not be influenced by warmer discharge waters, and shall not be in spawning or nursery areas of important fishes. Water velocity at screens and other exclusion devices shall also be at a minimum.

"3. Discharge shall be such that geographic areas affected by thermal plumes do not overlap or intersect. Plumes shall not affect fish spawning and nursery areas nor touch the lake bottom.

"4. Each discharger shall complete preliminary plans for appropriate facilities by December 31, 1971, final plans by June 30, 1972, and place such facilities in operation by December 31, 1973.

"5. All facilities discharging more than a daily average of 0.5 billion B.t.u./hour of waste heat shall continuously record intake and discharge temperature and flow and make those records available to regulatory agencies upon request.

"II. Applicable to all new waste heat discharges exceeding a daily average of 1/2 billion B.t.u./hour, except as noted above, which have not begun operation as of March 1, 1971, and which plan to use Lake Michigan waters for cooling:

"1. Cooling water discharges shall be limited to that amount essential for blowdown in the operation of a closed cycle cooling facility.

"2. New applications for powerplant construction permits must be submitted in the context of a regional power expansion plan and must provide evidence of participation in site planning by the State and Federal regulatory agencies. Public notice of proposed sites is to be given at least 5 years in advance of construction.

Recommendations

"3. Plants not in operation as of March 1, 1971, will be allowed to go into operation provided they are committed to a closed cycle cooling system construction schedule approved by the State regulatory agency and EPA. In all cases, construction of closed cycle systems and associated intake and discharge facilities shall be completed by December 31, 1974, for facilities utilizing natural draft towers and December 31, 1973, for all other types of closed cycle systems.

"III. The States agree to file with EPA within 6 months a plant-by-plant program identifying corrective actions for the modification of intake facilities, including powerplants and municipal and industiral users, to minimize the entrainment and damage to desirable aquatic organisms, and the modification of condenser cleaning systems for the use of inert mechanical devices in lieu of chemicals.

MR. STEIN: Thank you, Mr. Mayo.

Now, as you know, we cannot -- at least I don't think we can, if we are going to get a meaningful summary here -- proceed in the usual term of voting on amendments and motions, and so forth, and so on.

To prepare a summary, we are going to put out with care Illinois' point of view, the Federal conferee's point of view -- if they differ or are the same -- and any other points of view -- and we are going to direct these discussions and procedures so that everyone can be on record so we give a summary of the points of views of the conferees. That is the purpose here. We are not a deliberative vote-taking body, per se, as the first view.

Therefore, first I would ask the other conferees if they feel they can associate themselves in one measure or another; or even if they can't, whether they have suggestions or amendments they might want to make to either one of these proposals, and then we will have a discussion.

Mr. Purdy, do you want to speak to that?

MR. PURDY: Well, I am ready to take back to my Commission for public hearings general recommendations made by the Federal conferee. I would note that under item No. 4 that each discharger shall complete preliminary plans for appropriate facilities by December 31, 1971, final plans by June 30, 1972, and place such facilities in operation by December 31, 1973 -- that the only way that this could be accomplished is to assume that none of the facilities that might be included under item 4 would have to go to a wet draft or to a wet natural draft cooling tower.

I think it is quite clear from the information that has been presented here in the last several days that

42 months is apparently a reasonable time to look at for such facilities.

And I also recognize that if it is a modification of the outlet structure that it could be less time than the 42 months.

So with this full understanding, I would suggest that this would read: "... in operation no later than December 31, 1974." Again, with the full understanding that the final date would depend upon the type of facility needed.

MR. MAYO: May we make a response there? I think December 31, 1974, would be fine if we would just add something to the effect that if natural draft towers are required, and then it would relate it to that specific item.

MR. PURDY: Fine.

MR. STEIN: "Place such facilities"-- how about this -- and I don't want to do the drafting for you, but I think I get what you are saying, and I have no -- again, I want all of the conferees to understand that what I am saying now is in the sense of drafting and not plugging for any points.

"... such facilities to be in operation by December 31, 1973. However, in cases where natural draft towers are needed, this date shall be December 31, 1974."

MR. PURDY: Fine.

Recommendations

MR. STEIN: All right, now, do you have any other comments?

MR. PURDY: Yes. On II. 2. "New application for powerplant construction permits must be submitted in the context of a regional power plan and must provide evidence of participation in site planning by the State and Federal regulatory agencies. Public notice of proposed sites is to be given at least 5 years in advance of construction."

If this were a conference that involved its inland use, I would then think that possibly this might be an appropriate recommendation. But I do not, at this point, see where it is an appropriate recommendation with respect to water pollution control.

MR. STEIN: Mr. Mayo.

MR. MAYO: I think one of the objections of this that faces the conferees is the current lack of really meaningful controls on the planning for the siting of power generation plants on Lake Michigan.

Would it be acceptable to you if we could modify this in some way to say "it is desirable that new applications for powerplant construction permits be submitted?"

MR. PURDY: Certainly I think this is a desriable objective but from the standpoint of the Michigan Water Resources Commission, as I understand their authority --

having been with them for some 20 years -- it is not my opinion that the Michigan Water Resources Commission could adopt this as a standard, as a requirement, and as such I do not feel that I could recommend this in good faith to the Administrator.

MR. MAYO: I think your point is well taken, Mr. Purdy. What I would suggest would be that we delete that, and then I would recommend to the Administrator, in his transmittal back to the States, to the conferees, that he point this out as being desirable.

MR. PURDY: Fine.

MR. MILLER: Fine.

MR. STEIN: Let me make a comment on that, and I just make this as a general observation. Of course, there is a temptation in Conferences to take on the whole world because we are very flexible, and we have done this before. We have tried to get at land use, at acid mine drainage, and a lot of monitoring studies.

But, again, I think it has been my observation on the record in the past, the farther the Conference strays from its statutory -- specific statutory authority, and the core of this statutory authority to abate pollution, the least effective it is. And I think possibly -- and I recognize what Mr. Purdy is saying. The question of land use is really a -- of whether the States and Federal Government or localities are going to regulate land use for ecological reasons is a burning issue. Much legislation has been passed or proposed on this, but I also think it is fair to say that when the State water pollution boardsthat we have here were formulated, and our Federal legislation was formulated, at least the intrinsic underlying philosophy was that land use for us was -- and I hate to use another Latinism -- was ultra vires or beyond the scope of authority of the agency that was left somewhere else. So I think perhaps you, Mr. Mayo, in your response, have come up with a happy solution, because I think while this might be totally appropriate for the Administrator to suggest this in a letter, I think we may be stretching ourselves a little bit in the Conference.

So, as I understand this, you have agreed to eliminate 2 and 3 will become 2.

MR. MAYO: Yes, sir, under II.

MR. STEIN: Are there any other --

MR. PURDY: Yes.

I hate to have you use those Latinisms, too, Mr. Stein, because I don't understand them. But on Roman numeral III --

MR. STEIN: That is a Latinism, too, Roman numeral —

MR. PURDY: — The States agree to file with EPA within 6 months a plant-by-plant program identifying corrective actions for the modification of intake facilities to minimize the entrainment and damage to desirable aquatic organisms and the modification of condenser cleaning systems for the use of inert mechanical devices in lieu of chemicals.

I would prefer to see that sentence end after "desirable aquatic organisms."

MR. MAYO: Could you give me something in the way of some rationale?

MR. PURDY: Well, at this point in time, I am not convinced from the information that I have at hand that we should or have to go into the specification of use of inert mechanical devices. I think, under our present standards that have been approved in all of the States that if there is not something specific from the standpoint of toxic substances, that there is at least a general statement with respect to toxic substances that will spell out that discharges to waters of the State shall meet some sort of 96 hour TL_m or some other restriction, and it does not have to be dealt with here.

MR. MAYO: I will agree to that.

Recommendations

MR. STEIN: That we put a period after "organisms" on the proposal.

Mr. Purdy, any other comments?

MR. PURDY: None.

MR. STEIN: Mr. Miller, do you want to make any statement?

MR. MILLER: Mr. Chairman, I think that I certainly concur with the proposals made by the Federal conferee, as amended by Mr. Purdy, and take these back to the Indiana Stream Pollution Control Board with the recommendation that these be proposed and go to public hearing for adoption.

MR. STEIN: Mr. Frangos.

MR. FRANGOS: Yes, Mr. Stein. As you know, we have been urging something more and something sooner, but I think we also are anxious to arrive at some kind of consensus through this Conference mechanism, and, therefore, we would concur in this proposal as amended by Mr. Purdy's suggestion.

However, I would suggest that perhaps in III, we would also request that there be appraisal by each State of water supply intakes at all major water supplies using the lake, and to begin an assessment of whether there ought to be corrective actions on those facilities as well. I can't see the distinction between power facilities and any other large user as it relates to III. That language may not have been very good --

MR. STEIN: No, I am trying to see a modification to meet -- a modification of intake facilities including powerplants. What else do you want, "water purification plants?"

MR. FRANGOS: Okay.

MR. STEIN: "Including powerplants and water purification plants." Is that enough?

MR. FRANGOS: "And industrial users."

MR. STEIN: "Including powerplants and municipal and industrial users," right?

MR. FRANGOS: Okay. Good.

MR. STEIN: All right. Add that in.

MR. MILLER: Where do we add this?

MR. STEIN: After "facilities." "... for the modification of intake facilities ..." -- after that, comma -- "... including powerplants, municipal and industrial users, to minimize ...". Okay, that is just a modification.

Is that acceptable with you, sir?

MR. MAYO: Yes.

MR. STEIN: All right. Now, are there any other comments?

MR. CURRIE: Yes, Mr. Chairman.

MR. STEIN: Again, I think this has gone a long way and we have to come around again to Mr. Currie.

MR. CURRIE: I don't think it is sufficient for this Conference simply to take these recommendations back for public hearing purposes. I think it is important that we go on record as a body opposing proliferation of nuclear powerplants with once-through cooling on Lake Michigan. I think we should recommend to the individual States that they adopt a firm approach of that nature.

I think we have had a lot of tough talk here about the necessity for protecting the lake. I think we have an obligation to enunciate a firm policy, not simply a suggestion that we go back and think about it through the public hearing process.

I think moreover that our problem is essentially one of proliferation; it is not a problem with existing plants. I think we should deal with the problem of proliferation and deal with that firmly and only. I think we should not spend unnecessary money on backfitting, and I think we should deal with the entire problems of proliferation, and I do not believe that the Federal proposal is strong enough on the issue of proliferation.

The Federal proposal with regard to new plants in II. 2. contains an exemption for discharges under 1/2 billion B.t.u./hour. Working backward from the figures in the record with regard to the Zion plant, I conclude that is an exemption of any new powerplant of 70 megawatts or below. I see no excuse for that. I think we ought to take a firm policy against all new powerplants and, in fact, I see no reason why it should be limited to powerplants.

Again, I would ask -- because I believe that we can reach agreement on one firm and important matter of principle -- that we take a vote first before we consider all of the details of the Federal proposal on what I believe we can all agree on, which is the recommendation that I made a moment ago, that limitations should be placed on large volume heated water discharges by requiring closed cycle cooling systems using cooling towers or alternative cooling systems on all new powerplants not yet under construction.

MR. STEIN: Are there any other comments?

I want to make one thing clear. I would hope that we all understood what we are doing here at this conference is making recommendations for me to take back to the Administrator of the Federal Environmental Protection Agency. I know that many of the conferees who have been in other conferences know that. I took it when they said they could take this back to their Board that they were facing reality and know in addition to that they would have to go back and face their Board. But I don't think anyone should be under the illusion that we are just voting here or coming to a determination of a recommendation for a State to take back to its Board, because I am going to take a recommendation back to the Administrator.

Now, I would like to accommodate this but, Mr. Currie, I think we have a dilemma. If we were going to follow parliamentary rules, we have to operate on the amendment first. But I don't think what we want to do is have a vote. We want to have a position you adopted here.

Now, I am going to ask the conferees whether they want to adopt this position or your position When we are through with that I will be glad to have them record themselves on a vote on your proposition for you. But I think the obligation that we have under the Federal law -- and that is the one I have to observe -- is to bring back a summary of the views of the conferees. They may be a yes or no vote, or they may be just expressing different opinions, and I sense that what we have here is a judgment of two different approaches and two different opinions to the Administrator, and if we have two or more I bring them to the attention of the Administrator and he makes his judgment.

Now, with that, unless there is further discussion, I am going to call -- Mr. Mayo, you have heard Mr. Currie's proposal, and your proposal with the amendments made by the various States which you have accepted. Which do you propose to adopt?

MR. MAYO: That which I introduced as amended by Mr. Purdy and Mr. Frangos.

MR. STEIN: Mr. Purdy, which one will you?

MR. PURDY: Well, on the basis of the proposal of Mr. Currie -- that is without his explanation as to the reason why -- I don't see that his proposal is, say, in very drastic conflict with that of the Federal conferee, and I would have no objection in including his statement as such without his reasons for it to be included as a part of our concurrence.

MR. STEIN: But let me ask you two questions. Do you concur with this proposal as it stands, with the amendment?

MR. PURDY: Yes.

MR. STEIN: And you also make the proposal that in addition to this we use the statement made by Mr. Currie.

MR. PURDY: Yes.

MR. STEIN: All right.

Now, Mr. Miller.

MR. MILLER: I concur that we can use the proposal as submitted by the Federal conferee, and I also believe, as Mr. Purdy has stated, that the explanation by Mr. Currie is also consistent with what I see is meant in II.

MR. STEIN: Mr. Frangos.

MR. FRANGOS: Well, I would like to ask Mr. Currie to read the statement, again, please.

MR. CURRIE: Yes, and the statement is once again word-for-word that of Administrator Ruckelshaus, except as to its application to plants now under construction, which is a separate issue. And what I am asking now is agreement with Commissioner Ruckelshaus as to new sources.

"Limitation should be placed on large volume heated water discharges by requiring closed cycle cooling systems using cooling towers or alternative cooling systems on all new powerplants not yet under construction."

I wonder if Mr. Mayo really disagrees with that.

MR. STEIN: Well, I want to ask -- pardon me.

Mr. Frangos asked a question --

MR. FRANGOS: Well, I concur with the position that we could include both of those and I don't see that these are necessarily in conflict.

MR. MAYO: I would like to ask Mr. Currie if he feels that that additional statement is in any way in conflict with the material covered under II?

MR. CURRIE: Yes, I do because II contains an exclusion for plants not exceeding a daily average of one-half billion B.t.u./hour. In other words, I think that the specific proposal in II does not live up to the promise in Administrator Ruckelshaus' letter.

MR. MAYO: So that you would consider that the terminology "large volume heated discharges" -- "limitations would be placed on large volume heated discharges" is not in harmony with the one-half billion B.t.u./hour.

MR. CURRIE: I am referring to the additional language where it says "requiring closed cycle system on all new powerplants."

I would adhere to that request of the Administrator.

MR. MAYO: I am still not sure that I follow you.

MR. STEIN: Let me again try to assist on this. Maybe you can't be brought together. But if the issue here is the difference between the daily average of a half-billion B.t.u./hour, if you would substitute for that the language — what is that word?

MR. CURRIE: "All" is the word -- "all new powerplants."

MR. STEIN: "Applicable to all new powerplants except as noted above"-- what is that "noted above"? "Applicable to all new powerplants which have not begun operations"— and you had something on construction, but we can handle that, and "which plan to use Lake Michigan water for cooling." Then you can use 1 and 2 and be there. Is that correct?

MR. CURRIE: I am suggesting that II raises a number of different questions which I don't think we have to get into right now about plants that are presently under construction.

I would like, first of all, to have the conferees agree that we don't want any new powerplants on Lake Michigan using once-through cooling, and by "new" I mean those not under construction. I thought that was what we had agreed on. I thought that was what this Conference was specifically about — proliferation — that we should stop it now.

MR. STEIN: Well, Mr. Currie, I am not arguing with your conclusion, but I think — I have to state that the scope of the Conference is not just new powerplants or proliferation, but from all sources of pollution existing as well as otherwise or any other source.

MR. CURRIE: Yes.

MR. STEIN: Now, I understand your view. What

Mr. Currie is saying: If you adopt what Mr. Mayo has proposed, as amended -- Mr. Mayo's proposal and his proposal and you put them both together, there may be a conflict in II in the Mayo proposal with the proposal of Mr. Currie.

Do you find that to be so, or can you adjust that?

MR. CURRIE: Mr. Chairman, we have some disagreements which I view as relatively minor, with regard to what should be done with existing plants and those under construction. I am simply asking that we complete the polling of the Conference on the issue which I thought we all agreed on which was no new powerplants not yet under construction using once-through cooling. Can we simply face that proposition and decide it?

MR. STEIN: Well, we are facing it and we are going through, I thought -- I had at least polled three of the States -- all of the other States -- and they seem to agree with you on this. We have got to deal with the fourth State and as soon as we get through with that, I will go to Mr. Mayo.

MR. CURRIE: Well, I agree with my proposal.

MR. STEIN: Mr. Mayo, what do you want to do?

MR. MAYO: Well, I am not sure I understand Mr. Currie's proposal, and I would not object to a modification that doesn't build any contradiction, and I haven't yet got the assurance that what is here now and what Mr. Currie is proposing aren't in conflict.

MR. CURRIE: What is it about Administrator Ruckelshaus' language that you find contradictory?

MR. MAYO: Well, I am not sure about the way you are putting it together is what concerns me, because you are taking it in part, I think, and adding to it in a way that may change its sense. I want to be sure that that sense is not changed. If it is changed, that we don't build in a contradiction to what we have already addressed ourselves to.

MR. CURRIE: Then, am I -- let me ask Mr. Mayo: Are you insisting that there be an allowance of proliferation of small plants?

MR. MAYO: No, I am not.

MR. CURRIE: Then, why do you object to my proposal?

MR. MAYO: Not in any sense. I am concerned -- I am not assured that there isn't a contradiction here.

MR. STEIN: Let me ask both of you people -- and I would like to get this through -- I think what we are doing is --

MR. MAYO: We are very close to agreement, Mr.

Chairman.

MR. STEIN: Just a moment. I think we are in a situation here in which we don't have any substantive agreement. I think with an issue like this, it may be a technical problem on drafting. We have gone through all of the States and the Federal conferee and you are all in agreement. The sole question that I find in the question of drafting is whether this language proposed by Mr. Currie, which everyone seems to think is appropriate, is in any way in conflict with your proposal, Mr. Mayo, of particularly II. Now, if it is, and you have no substantial agreement, let's get that language together.

I am going to recess the meeting for 10 minutes.

(Short recess.)

MR. STEIN: Let's reconvene.

I think the conferees have had an opportunity to try to get together during this recess. I was generous with the time.

Now, my recommendation would be that as soon as possible we come up with the question, and, if there are any differences, I will poll the conferees. I am not sure, unless you want to go forward, that any further discussion is going to get you any closer. We are as close as we can get now possibly at this meeting.

Recommendations

Mr. Mayo, may I ask you to go ahead?

MR. MAYO: I certainly concur with Mr. Currie's concern about the conferees needing to express themselves on the subject matter of proliferation.

I feel this could be done very adequately by adding the Roman numeral IV which would read as follows: "The States agree that there should not be a proliferation of new powerplants on Lake Michigan, and that in addition to the above controls limitation should be placed on large volume heated water discharges by requiring closed cycle cooling systems, using cooling towers or alternative cooling systems on all new powerplants."

Now, that statement would make abundant use of the language in Mr. Ruckelshaus' letter, but it would make it clear that this would be a limitation in addition to those that were stated earlier in the recommendations.

MR. STEIN: And this would be Roman numeral IV?

MR. MAYO: Yes.

MR. STEIN: All right, now, I would like to correct the record. This has been called to my attention during the recess. There was a contention that when you read this, Mr. Mayo, that there may have been a little slip in the reading.

Let me just go through to get this -- this is just for technical purposes.

On No. 1, where you say "Applicable to all waste heat discharges except as noted above:" this reads:

"1. At any time, and at a maximum distance of 1,000 feet from a fixed point adjacent to the discharge, (agreed upon by the State and Federal regulatory agencies),"* and the rest is all right. Is that correct?

MR. FETTEROLF: Yes, sir.

MR. STEIN: And I think we have the record correct.

Now, I think now what we have before us -- let me try to do this, and we will give Mr. Currie the floor in a moment. I just want to set this straight.

With that correction and Mr. Mayo's proposal No. IV, if the amendments and modifications he suggested are -- this is one proposition which presumably, Mr. Mayo, you believe covers Mr. Currie's point as far as you can go.

MR. MAYO: Yes.

MR. STEIN: Okay. I don't know what Mr. Currie thinks, but Mr. Currie, do you want to speak to this? What I propose to do is call for an expression on Mr. Mayo's proposal with the amendments, including his paragraph IV, to call on the conferees for an expression of an endorsement of your proposal and see if they want to pick one or the other or both.

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* See original reading P. 104 with omission.

MR. FRANGOS: Mr. Stein, could I just interject a moment here on Mr. Mayo's IV? Can we have him join with us and make it the conferees rather than the States?

MR. MAYO: Okay. It was not in the context of --

MR. FRANGOS: III. Very good.

MR. STEIN: Are there any other comments?

MR. CURRIE: Yes, Mr. Chairman.

MR. STEIN: Yes, Mr. Currie.

MR. CURRIE: What bothers me about that proposal is that it is an attempt to make it impossible to express a view against proliferation without agreeing with Mr. Mayo on all of the other points in his document, and I think this is totally unnecessary. I would be happy to agree to his statement if we are talking about a vote on his proposition No. IV only, leaving the other issues to be resolved later, and if the words "in addition to" are omitted. If he wants to say "as a minimum," that is all right, so as to indicate that this is a vote taken without prejudice to anything the conferees may later choose to do on many of the other issues before them. But I don't think it is fair to ask us to commit ourselves on other issues in order to express ourselves on this one.

MR. STEIN: No, sir, I am not going to put the expression that Mr. Mayo has made as a proposal, I, II, III, and IV, with several subproposals. Any of the conferees can agree to all of these or none of them or any part they wish. This is not the question of a vote where you are -- and this is what I tried to make clear -- what we want is a full and complete expression of each conferee's view, and you do not have to swallow this whole one way or the other. You can take any part or none of it.

With that, I just feel like ole Al Sabath from Chicago, who used to say, "I guess it is time to call the roll."

Mr. Mayo, I take it -- how do you feel about your I, II, III and IV you propose?

MR. CURRIE: How does he feel about the motion on the floor?

MR. STEIN: Well, I don't know we are dealing with motions, sir.

MR. CURRIE: I have moved one.

MR. STEIN: Well, if you want to go with motions, repeat your motion and we will go that way, Mr. Currie.

MR. CURRIE: I move that the Conference recommend that the States adopt the following policy: "Limitations should be placed on large volume heated water discharges by requiring closed cycle cooling systems using cooling towers or alternative cooling systems on all new sources discharging more than a daily average of 1/10 billion B.t.u./hour, and not yet under construction."

MR. STEIN: Any seconds to that motion?

I hear none.

Mr. Mayo.

MR. MAYO: Mr. Chairman, I move that we proceed with the adoption of the recommendations offered by the Federal conferee with the amendments offered by Mr. Purdy --

MR. STEIN: Unless you want to, I would not place this in the form of a motion, Mr. Mayo. I would like to follow our usual procedure and poll the conferees.

How do you feel about this? I guess you are in favor of it.

MR. MAYO: Yes, I am.

MR. STEIN: Mr. Purdy.

MR. PURDY: We are talking about I, II, III, and IV?

MR. STEIN: Yes, sir.

MR. PURDY: Fine. Good idea.

MR. STEIN: Mr. Miller.

MR. MILLER: I will concur with I, II, III, and IV.

MR. STEIN: Mr. Frangos.

MR. FRANGOS: Yes, I concur, but I just offer the observation that I am puzzled why we can't perhaps accommodate Mr. Currie in his recommendation. I think we are trying hard, and I think we are awfully close.

MR. STEIN: Well, the Chair is puzzled, too, but I am inhibited by the position I hold here. I suspect, as I pointed out before the recess, and that is why I tried to do it, that the differences were more apparent than real. But I also think we are grinding on here. We have people who have come to testify on various aspects, and we just have to do the best we can in a reasonable time.

Again, I go back to Al Sabath , who was a wise old man and Dean of the House for many years -- "You can go so long and then you have to call the roll." And I think that is where we are now.

Do I take it, Mr. Frangos, you concur?

MR. FRANGOS: Yes, I do.

MR. STEIN: Mr. Currie.

MR. CURRIE: I do not concur.

MR. STEIN: Right. Do you want your motion to be put in the form of your recommendation for the conferees as the recommendation to go to the Administrator?

MR. CURRIE: Yes, I do. Thank you.

MR. STEIN: Yes, the record will so show this.

This completes the recommendation on the thermal pollution question.

Now --

MR. FRANGOS: Mr. Stein, I am wondering, would it be possible to secure from your agency those recommendations as soon as possible?

MR. STEIN: I am glad you said "as soon as possible."

Now, I would suggest, in view of the interest on this, we charge the Region with this? I know we have kept notes. I have notes. You may want to send an outpost to Columbus, Ohio, to keep Mr. and Mrs. Hall company, but I think that we should try to assemble the findings and the conclusions together which may be a little difficult very rapidly. What is today, Thursday? We should try to do this by this week.

Now, I would ask in view of the complexity of this, the better part of valor would be if you could circulate this rapidly to the States. I ask the States to respond very rapidly and confine themselves to what their recollection is. If their notes change, don't change your ideas. I think if we operate in this manner with judicious use of the telephone, teletype, etc., we should be able by Monday to be able to have clean copies of this.

WATER QUALITY OFFICE
33 EAST CONGRESS PARKWAY, ROOM 410
CHICAGO, ILLINOIS 60605

April 30, 1971

TO: CONFEREES - LAKE MICHIGAN ENFORCEMENT CONFERENCE

Enclosed find copies of the findings and recommendations of the Lake Michigan Enforcement Conference meeting on March 25, 1971 in regard to thermal discharges as revised from the transcript. Two small changes in language on findings 3 and 6 proposed by the Michigan Conferee are included.

James O. McDonald
Regional Regulatory Programs Director
Office of Regulatory Programs

Enclosure

ccs: Ralph W. Purdy
Perry Miller
David P. Currie
William L. Blaser
Thomas G. Frangos
Francis T. Mayo

REVISED FROM THE TRANSCRIPT

LAKE MICHIGAN ENFORCEMENT CONFERENCE

FINDINGS

1. That the lake as a whole will not be warmed, except in localized areas by discharges of waste heat from existing and presently proposed power plants.
2. Safe temperatures in the lake vary with season and species.
3. Heat is not persistent in the lake.
4. Timing of food and fish hatching is precarious.
5. In the summer, Lake Michigan is "a lake over a lake," the top one is much warmer than the bottom one.
6. Maximum temperatures are not safe for long periods -- lethal temperatures must be related to time of exposure.
7. Mean temperatures must be lower than the maximums.
8. Fish kill hazards are greatest in winter.
9. The area that would be raised in temperature more than 5° by the heated discharge from a 100 mw nuclear plant, designed so as to maximize dilution, could if the only theoretical appraisal in the record (that of Dr. D. W. Pritchard) is correct, be limited to the order of ten acres, and the area raised 2° to the order of 100 acres.
10. If the only theoretical appraisal in the record (that of Dr. D. W. Pritchard) is correct, such a plant could be built so that any given particle of water, or any organism, drawn through its condensers would be exposed to temperatures 20° above ambient for two minutes during passage, and any particle or organism discharged or entrained

would be exposed thereafter to temperatures more than 10° above ambient for the order of forty-five seconds, more than 5° for six minutes, and more than 2° for one and a half hours.

11. If the only theoretical appraisal in the record (that of Dr. D. W. Pritchard) is correct, a properly designed discharge structure can avoid any significant increase in temperature on the lake bottom or along the shore.

12. Perfect mixing is not possible. Consequently if no limits are imposed the proliferation of waste heat discharges from electric plants along the lake may result in the warming by several degrees of a large fraction of the inshore waters.

13. The interaction of two or more thermal plumes may have a more than linear effect on the area affected by a rise in temperature and on the residence time of any particle at elevated temperatures.

14. A single 1000 mw nuclear plant will create a small zone uninhabitable by certain species of fish during the warmer months and unsuitable for spawning and other significant fish activities at various times.

15. An unknown percentage of organisms passing through the condensers of a power plant will be killed or damaged by heat, physical shock, or chemicals. Therefore the damage is likely to be proportional to the volume of water intake.

16. Discharges from a single large plant located in the spawning ground or across a migratory route could significantly disrupt the balance of the affected species throughout the lake.

17. If the only theoretical appraisal in the record (that of (Dr. D. W. Pritchard) is correct, the residence time of algal cells in the heated plume from a properly designed single 1000 mw plant is probably too short to cause any detectable shift to less desirable species, and no significant increase in total algal mass is to be expected.

18a. On the basis of information currently available, unless it is located so as to interfere with spawning or migration, a single 1000 mw plant will have local effects some of which have been noted above but the effect on the balance of the lake as a whole is not known at this time.

(U.S. Environmental Protection Agency & Wisconsin - Yes //
Other 3 States - No)

18b. On the basis of information currently available, unless it is located so as to interfere with spawning or migration, a single 1000 mw plant will have local effects, some of which have been noted above, but may not upset the balance of the lake as a whole.

(Illinois, Michigan & Indiana - Yes //
EPA & Wisconsin - No)

19. Proliferation of waste heat discharges from electric plants along the lake could seriously worsen the problem of nuisance algae by favoring the less desirable species and could seriously alter the balance of fish and other organisms in the lake as a whole.

20. Various alternative methods of heat disposal are technically feasible, including wet and dry cooling towers, cooling ponds, and spray canals. The backfitting of all but dry towers is technically feasible.

21. To backfit wet towers at a single 2100 mw nuclear plant would cost somewhere between $20 million and $120 million. At the Zion plant this is estimated to cost average residential customers somewhere between

10¢ and 69¢ per month.

22. All alternative cooling means may have some undesirable environmental effects. Wet towers can cause fog problems. Towers discharge blowdown water that may require treatment before release. Dry towers may cause as yet undetermined meteorological changes. Both wet and dry towers are bulky additions to the lakefront. Cooling ponds consume about two acres of land per megawatt.

23. The existing Federally approved water quality standards to control waste heat discharges do not offer adequate protection for the waters of Lake Michigan and its continued beneficial uses.

24. The effective management of waste heat discharges into Lake Michigan makes it desirable for the states to adopt reasonably uniform minimum water quality standards.

25. The evidence presented to the Conference does not permit a determination of the overall damage of large waste heat discharges to Lake Michigan from existing or planned power generation plants. (U.S. Environmental Protection Agency - Yes// States - No)

26. Additional evidence is desirable as to the behavior of waste heat plumes during winter months. Their impact on the ecosystem of Lake Michigan is not now fully assessable.

REVISED FROM THE TRANSCRIPT

LAKE MICHIGAN ENFORCEMENT CONFERENCE

RECOMMENDATIONS

(Concurred in by Indiana, Michigan, Wisconsin & EPA)

In order to protect Lake Michigan the following controls for waste heat discharges are concurred in by the Conferees. Municipal waste and water treatment plants, and vessels are exempted from these recommendations.

I. Applicable to all waste heat discharges except as noted above:

1. At any time, and at a maximum distance of 1000 feet from a fixed point adjacent to the discharge, (agreed upon by the State and Federal regulatory agencies), the receiving water temperature shall not be more than 3°F above the existing natural temperature nor shall the maximum temperature exceed those listed below whichever is lower:

	Surface 3 Feet
January	45
February	45
March	45
April	55
May	60
June	70
July	80
August	80
September	80
October	65
November	60
December	50

2. Water intake shall be designed and located to minimize entrainment and damage to desirable aquatic organisms. Requirements may vary depending upon local situations but, in general, intakes are to have minimum water velocity, shall not be influenced by warmer discharge waters, and shall not be in spawning or nursery areas of important fishes. Water velocity at screens and other exclusion devices shall also be at a minimum.

3. Discharge shall be such that geographic areas affected by thermal plumes do not overlap or intersect. Plumes shall not affect fish spawning and nursery areas nor touch the lake bottom.

4. Each discharger shall complete preliminary plans for appropriate facilities by December 31, 1971, final plans by June 20, 1972, and place such facilities in operation by December 31, 1973. However in cases where natural draft towers are needed, this date shall be December 31, 1974.

5. All facilities discharging more than a daily average of 0.5 billion BTU/hour of waste heat shall continuously record intake and discharge temperature and flow and make those records available to regulatory agencies upon request.

II. Applicable to all new waste heat discharges exceeding a daily average of 1/2 billion BTU/hour, except as noted above, which have not begun operation as of March 1, 1971, and which plan to use Lake Michigan waters for cooling:

1. Cooling water discharges shall be limited to that amount essential for blowdown in the operation of a closed cycle cooling facility.

2. Plants not in operation as of March 1, 1971 will be allowed to go into operation provided they are committed to a closed cycle cooling system construction schedule approved by the State regulatory agency and EPA. In all cases construction of closed cycle systems and associated intake and discharge facilities shall be completed by December 31, 1974 for facilities utilizing natural draft towers and December 31, 1973 for all other types of closed cycle systems.

III. The States agree to file with EPA within six months a plant by plant program identifying corrective actions for the modification of intake facilities, including power plants, municipal and industrial users, to minimize the entrainment and damage to desirable aquatic organisms.

IV. The Conferees agree that there should not be a proliferation of new power plants on Lake Michigan and that in addition to the above controls, limitations should be placed on large volume heated water discharges by requiring closed cycle cooling systems, using cooling towers or alternative cooling systems on all new power plants.

RECOMMENDATION PROPOSED BY ILLINOIS

Limitations should be placed on large volume heated water discharges by requiring closed cycle cooling systems, using cooling towers or alternative cooling systems on all new sources discharging more than a daily average of 0.1 billion BTU/hour and not yet under construction.

WATER QUALITY OFFICE
33 EAST CONGRESS PARKWAY, ROOM 410
CHICAGO, ILLINOIS 60605

March 30, 1971

Mr. Perry Miller
Technical Secretary
Stream Pollution Control Board
Indiana State Board of Health
1330 West Michigan Street
Indianapolis, Indiana 46207

Dear Mr. Miller:

Attached are the Findings and Recommendations from the Lake Michigan Enforcement Conference. These were developed from my notes and not from the transcript.

Please let me know as soon as possible if your notes show a deviation from these.

Sincerely yours,

Dale S. Bryson
Deputy Director
Office of Regulatory Programs

Attachments
  Findings
  Recommendations

DSBryson/jm

IDENTICAL LETTERS SENT TO MILLER, PURDY, FRANGOS, CURRIE w/copy to Blaser

NOTE: *The following was prepared from notes taken at the Conference and not from the transcript.*

LAKE MICHIGAN ENFORCEMENT CONFERENCE

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(Concurred in by Indiana, Michigan, Wisconsin & USEPA)

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3. Discharge shall be such that geographic areas affected by thermal plumes do not overlap or intersect. Plumes shall not affect fish spawning and nursery areas nor touch the lake bottom.

4. Each discharger shall complete preliminary plans for appropriate facilities by December 31, 1971, final plans by June 30, 1972, and place such facilities in operation by December 31, 1973, however in cases where natural draft towers are needed, this date shall be June 31, 1974.

5. All facilities discharging more than a daily average of 0.5 billion BTU/hour of waste heat shall continuously record intake and discharge temperature and flow and make those records available to regulatory agencies upon request.

II. Applicable to all new waste heat discharges exceeding a daily average of 1/2 billion BTU/hour, except as noted above, which have not begun operation as of March 1, 1971, and which plan to use Lake Michigan waters for cooling:

1. Cooling water discharges shall be limited to that amount essential for blowdown in the operation of a closed cycle cooling facility.

2. Plants not in operation as of March 1, 1971 will be allowed to go into operation provided they are committed to a closed cycle cooling system construction schedule approved by the State regulatory agency and EPA. In all cases construction of closed cycle systems and associated intake and discharge facilities shall be completed by December 31, 1974 for facilities utilizing natural draft towers and December 31, 1973 for all other types of closed cycle systems.

III. The States agree to file with EPA within six months a plant by plant program identifying corrective actions for the modification of intake facilities, including power plants, municipal and industrial users, to minimize the entrainment and damage to desirable aquatic organisms.

IV. The Conferees agree that there should not be a proliferation of new power plants on Lake Michigan and that in addition to the above controls limitations should be placed on large volume heated water discharges by requiring closed cycling cooling systems, using cooling towers or alternative cooling systems on all new power plants.

RECOMMENDATION PROPOSED BY ILLINOIS

It is recommended that limitations should be placed on large volume heated water discharges by requiring closed cycle cooling systems, using cooling towers or alternative cooling systems on all new sources discharging more than a daily average of 0.1 billion BTU/hour and not yet under construction.

NOTE: The following was prepared from notes taken at the Conference and not from the transcript.

LAKE MICHIGAN ENFORCEMENT CONFERENCE

FINDINGS

1. That the lake as a whole will not be warmed, except in localized areas by existing and presently proposed power plants.
2. Safe temperatures vary with season and species.
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7. Mean temperatures must be lower than the maximums.
8. Fish kill hazards are greatest in winter.
9. The area that would be raised in temperature more than 5° by the heated discharge from a 1000 mw nuclear plant, designed so as to maximize dilution, could if the only theoretical appraisal in the record is correct (that of Dr. B. W. Pritchard) be limited to the order of ten acres, and the area raised 2° to the order of 100 acres.
10. If the only theoretical appraisal in the record is correct (that of Dr. B. W. Pritchard), such a plant could be built so that any given particle of water, or any organism, drawn through its condensers

would be exposed to temperatures 20° above ambient for two minutes during passage, and any particle or organism discharged or entrained would be exposed thereafter to temperatures more than 10° above ⑧ ambient for the order of forty-five seconds, more than 5° for six minutes, and more than 2° for one and a half hours.

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12. Perfect mixing is not possible. Consequently if no limits are imposed the proliferation of waste heat discharges from electric plants along the lake may result in the warming by several degrees of a large fraction of the inshore waters.

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(U.S. Environmental Protection Agency & Wisconsin - Yes //
Other 3 States - No)

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this is estimated to cost average residential customers somewhere between 10¢ and 69¢ per month.

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23. The existing Federally approved water quality standards to control waste heat discharges do not offer adequate protection for the waters of Lake Michigan and its continued beneficial uses.

24. The effective management of waste heat discharges into Lake Michigan makes it desirable for the states to adopt reasonably uniform minimum water quality standards.

25. The evidence presented to the Conference does not permit a quantification of the overall damage of large waste heat discharges to Lake Michigan from any potential number of existing or planned power generation plants. (U.S. Environmental Protection Agency - Yes//States - No)

26. Additional evidence is desirable as to the behavior of waste heat plumes during winter months and therefore the impact on the ecosystem of Lake Michigan is not now fully assessable.

(The succeeding pages contain that part of the Conference which followed the Executive Session.)

- - -

MR. STEIN: Gentlemen, let me say this: We have a Pesticide Committee Report, Status of Compliance with Conference Recommendations, Discussion of the Phosphorus and Chloride Loadings in Lake Michigan, and other statements.

MR. CURRIE: Mr. Chairman.

MR. STEIN: Yes.

MR. CURRIE: Mr. James Vaughn of the city of Chicago is here and would like to make a statement with regard to water quality sampling. I wonder if this is the time --

MR. STEIN: I was just going to suggest that, Mr. Currie, that would just be fine.

I was going to make a general statement. I think, in view of the time we took, if the conferees would consider it appropriate, I would ask that requests like Mr. Currie's be honored now and we ask all of the conferees to call upon those outside people who have been here waiting patiently to make statements and let them go on first before we take up these other matters.

If I hear no objection, Mr. Currie, do you want to call Mr. Vaughn?

MR. PURDY: Mr. Stein, I would only say that I can stay as long as you wish to operate tonight, but I will not be here in the morning.

MR. STEIN: I understand that. But I really do think we have an obligation to the citizens on time and I think we have to let them go on first.

STATEMENT OF JAMES C. VAUGHN, ENGINEER OF WATER PURIFICATION, DEPARTMENT OF WATER AND SEWERS, CITY OF CHICAGO, ILLINOIS

MR. VAUGHN: Mr. Chairman, some weeks ago, in the absence of a plan to present to the people of this Conference, we accepted a request of the American Water Works Association to prepare and present a paper at their section last week, which we did, and that paper is now in the public domain and it is permissible to use it wherever desired.

I will not read this entire paper. I would just make a few remarks and read my conclusions, and request that the paper in its entirety including tables and charts be included in the record for whatever purpose.

MR. STEIN: Without objection this will be done. (Mr. Vaughn's paper follows in its entirety.)

STATUS OF WATER QUALITY AT THE SOUTHERN END OF LAKE MICHIGAN

Presented for the Record at the Four-State Pollution Conference at
Chicago, Illinois

March 25, 1971

Prepared for the Bureau of Water
Department of Water & Sewers

by

James C. Vaughn, Engineer of Water Purification
Philip A. Reed, Filtration Engineer V

City of Chicago
Department of Water & Sewers

Richard J. Daley, Mayor

James W. Jardine, Commissioner

Raymond D. Johnsos
Deputy Commissioner for Water

Richard A. Pavia
Deputy Commissioner for Water & Sewers

John B. W. Corey
Chief Water Engineer

STATUS OF WATER QUALITY AT THE SOUTHERN END OF LAKE MICHIGAN

Presented at the 62nd Annual Conference of the Illinois Section
of the American Water Works Association

March 18, 1971

Prepared for the Bureau of Water
Department of Water & Sewers

by

James C. Vaughn, Engineer of Water Purification
Philip A. Reed, Filtration Engineer V

City of Chicago
Department of Water & Sewers

Richard J. Daley, Mayor

James W. Jardine, Commissioner

Raymond D. Johnsos
Deputy Commissioner for Water

Richard A. Pavia
Deputy Commissioner for Water & Sewers

John B. W. Corey
Chief Water Engineer

STATUS OF WATER QUALITY AT THE SOUTHERN END OF LAKE MICHIGAN

This report on pollution of Lake Michigan and its tributary basin will be similar in most respects to those presented previously. In general the story is one of continuing improvement in water quality. However, increases in concentration of certain constituents make one anxious for the future. On the whole, the record as summarized here suggests that gains have been made in improving water quality of Lake Michigan, permits one to infer that further gains are possible, and at the same time points out the directions in which gains in quality are necessary. It provides grounds for hope, but not for complacency.

For orientation, Figure 1 locates Chicago with respect to major features of the southwest part of Lake Michigan. The City, its intakes, and its treatment plants are located between the Calumet industrial area and what is often called the North Shore. Reference will be made to both areas later.

The next several figures describe certain parameters important to operation of the South Water Filtration Plant (SWFP). Figure 2 demonstrates that the bacteriological quality of the raw lake water continued to improve during 1970. Previous improvements have often been followed, one can see, by deterioration, but the fact that the most recent improvement has continued for three years provides ground at least to hope that it will be permanent.

Figures 3, 4, and 5 illustrate the data in Table 2. Here again is continued improvement. As Figure 3 shows, during 1970, both the number of "oil refinery" odor days and of odor periods are much less than the corresponding values for 1969.

Similarly, in Figure 4, one can see clearly that the ammonia nitrogen concentrations associated with hydrocarbon odors have continued to decline. These two parameters (odor and ammonia nitrogen) are important for their effect on plant and operating costs, since they profoundly affect the amounts of activated carbon and of chlorine required for proper treatment of the water.

It will come as no surprise by now to see that Figure 5 demonstrates that in fact the maximum activated carbon dosage required for treatment of hydrocarbon odors decreased during 1970 to a value below any previous one shown on the figure.

Figures 6 through 9 contain selected data related to water quality in the Calumet industrial region, south of Chicago. Figure 6 is a map on which are indicated water system intakes, standard sampling points, and the principal waterways which connect to Lake Michigan. It is interesting to note at this time some recent variations in parameter values at certain points. At Point 1, for example, the cyanide values usually run less than 0.1 ppm. On January 12, 1971, the value was 0.206 ppm and on February 4, 1971, the value was 0.202. At Point 9 the cyanide values have ranged from 0.228 ppm to 0.447 ppm. Point 13 on the Indiana Harbor Ship Canal (IHSC) is below (in the direction of flow) the outfalls of two municipal waste treatment plants. The ammonia nitrogen values of samples taken at Point 13 often fall in the 3.0 - 8.0 ppm range. Some recent NH_3-N values at this point are: February 4, 1971, 12.0 ppm; February 9, 1971, 11.0 ppm; and February 18, 1971, 14.0 ppm. These values indicate the discharge of inadequately treated wastes near these sampling points.

On Figure 7 one sees annual values for average coliform MPN at the mouth of the IHSC and the mouth of the Calumet River. Here again, coliform MPN's have been decreasing for three years.

The picture in Figure 8 is somewhat different. The annual average ammonia nitrogen at the mouth of the Calumet River was near its 20-year peak in 1967 and 1968, but has decreased significantly in 1970. In the upper curve, the ammonia nitrogen at the mouth of IHSC, which had actually been above the scale on the chart in 1968 and 1969, has decreased noticeably. The values at the mouth of the IHSC in 1970 are far higher than most historical ones, and certainly far higher than one would wish to see, but at least there has been a relative improvement.

In Figure 9 one notices that phenol concentrations at the mouth of the IHSC have decreased somewhat in 1970.

Figures 10, 11, and 12 illustrate, in part, those changes in water quality which should cause concern. As Figure 10 demonstrates, nutrient concentrations are and have long been high enough to permit nuisance algae growths. The data collected in 1969 suggested that numbers of plankton might be starting to decline, but the data for 1970 contradict this interpretation. As the eye looks over this bar chart, it automatically tends to see two continuous curves. The annual averages would lie along a curve which tends to increase toward the right, at first gradually, then more steeply. Examination of the bars for the maximum day produces an effect which is generally similar but much more pronounced. One is strongly tempted to conclude that the decrease in 1969 was merely a statistical randomness of the kind one should expect in a curve which is increasing at an exponential rate.

On examining determinations of phosphate in Lake Michigan water at Chicago, one finds a possible explanation for the difference between 1969 and 1970 data. Tabulated below are selected points from distributions of total phosphate for the last three years:

	PERCENTAGE POINTS OF DISTRIBUTION		
Year	5%	50% (median)	95%
1968	0.01 ppm	0.05 ppm	0.14 ppm
1969	0.01	0.04	0.12
1970	0.03	0.06	0.23

A few other statistics are significant. The arithmetic average concentration for total phosphate in 1969 was 0.05 ppm; in 1970 it was 0.06 ppm. In 1969, 60% of determinations were above 0.04 ppm; in 1970, 85% have been above this value.

When one compares the data with the value of 0.03 ppm which is often quoted as the threshold above which nuisance algal blooms may occur, an even more depressing set of figures emerges. In 1968, 80% of determinations were above this limit. In 1969, 70% were higher. In 1970, 93% were higher.

Either the reduction in phosphate observed in 1969 was illusory and merely a product of chance, or the ground gained in 1969 has been lost, and more along with it. Whatever interpretation is correct, data collected at Chicago provide no basis at present for asserting that any improvement, i.e. reduction, in phosphate levels of Lake Michigan has occurred. On the contrary, they suggest an increase of about 50% in the quantities of phosphorus entering the Lake.

One peculair aspect of these data becomes evident when one plots their size distributions. In 1968 and 1969 the distributions were skewed to the right; that is, there were more high values than would be expected from sampling in a lake at equilibrium with respect to phosphate concentration. This could be caused by irregular large inputs, by inadequate mixing of waters receiving constant inputs, or perhaps for other reasons. In the 1970 data, this skewness has been reduced. This suggests that the Lake is tending to approach equilibrium at its present concentration of phosphate. If this interpretation is correct, there is reason for great concern over the future of the Lake in this region. It would imply that one should expect nuisance algal growth, blooms, taste and odor problems, and perhaps even periodic deoxygenation of parts of the Lake until mixing with the deeper waters plus whatever processes may cause deposition in sediments have reduced the concentration of dissolved phosphate below whatever level is critical for Lake Michigan.

Surveys of Lake Michigan near Chicago

Figure 11, taken from the City's third report to this conference, represents the trend of chloride and sulfate concentrations over the period 1860-1960. It is worth noting that it shows the same sort of exponential increase in concentration as was suggested earlier in the discussion of plankton numbers.

Portions of these curves, together with straight-line trends based on a simpler method of interpretation are shown in Figure 12. As suggested in the third report, the sulfate concentrations continue to lie between the two projections, while the chloride concentrations remain near the straight line. Both have increased. Perhaps more significant, however, is the fact that here again the variation has begun to resemble more closely that which one would expect in sampling from an equilibrated system.

Figure 13, based principally on data in Table 4, may appropriately conclude our discussion of data collected at Chicago water works intakes. It illustrates, in terms of raw water odors and carbon usage, the improvement that has taken place in one important characteristic of Lake Michigan at Chicago. During 1970, odors were less frequent and less severe. On only one day, April 20, 1970, was it necessary to feed more than 30,000 lb of carbon. This contrasts with ten days in 1969, and an average of 17 days per year for the last 10 years. Further confirmation of improvement in raw water quality will be noted if one examines Tables 3, 6, 7, and 8. Whatever may be in store for the future, there is no denying that from the plant operator's point of view, there has been improvement recently in the quality of raw water.

Turning now to measurements over a larger area, let us consider in Figures 14-17 some of the data collected in our lake sampling programs. The limits on the chart are those originally set by the Illinois Sanitary Water Board for the open waters of Lake Michigan, and have received the approval of the federal government. Clearly, at nearly every location covered by these surveys, the phosphate concentration increased above the concentrations found in 1969. At one point (8N) no change was observed. Clearly, too, concentrations at all points were above the annual average concentrations in the relevant Environmental Protection Agency (EPA) standard.

In Figure 15, plotted in the same manner and showing average ammonia nitrogen concentrations, there has been a small decrease in general compared to 1969 measurements, although concentrations in general are equal to or above the maximum annual average permitted by the federally-approved EPA standards.

Figure 16 compares data for 1969 and 1970 on total and fecal coliform organisms at the same locations. Obviously, even taking the logarithmic nature of the scale into account, there has been a sharp decrease at every point, except at Point 7N off Waukegan, as there have been decreases at locations mentioned earlier.

Figure 17 illustrates average phosphate concentrations for surveys during the year along the shore of the lake south of the area shown in Figures 14, 15, and 16. Here phosphate concentrations at all points, except 3S at the mouth of the Calumet River, have declined slightly. All are above the maximum annual average concentration of EPA standard, and most of the averages are above the higher limit for daily values.

EPA Standards

Table 5 summarizes results of tests made for six years on 17 of the parameters in the EPA standard for open waters of Lake Michigan. For each fraction, the numerator is the number of days on which the standard was exceeded; the denominator, the number of days for which tests were made. Data for 1965-1969 have been reduced to annual averages. The increases in permissible concentration for chloride, sulfate, and filterable residue incorporated into the EPA standard were assumed to take effect at the start of 1970.

In the main, these data confirm what has been said earlier. Changes in bacteriological and most chemical parameters in 1970 suggest improvement in water quality of the Lake. It is interesting to note that chloride concentration which exceeded the 1965-1969 standard only once in five years, has exceeded the more generous 1970 standard six times. Sulfate concentration, which never exceeded the 1965-1969 maximum daily concentration, has exceeded the larger permissible maximum daily concentration 22 times so far in 1970. Filterable residue, which exceeded the 1965-1969 permissible concentration only three times in five years, has exceeded a larger permissible concentration 66 times in 1970. And, of course, total phosphate, whose permissible concentration remains unchanged at 0.04 mg/l for daily samples, and which exceeded this concentration nearly half the time in 1965-1969, is now exceeding that concentration about 72% of the time.

Following the report of finding mercury in the Lake St. Clair, Port Huron and Sarnia Area, government, state, and municipal laboratories began testing in various areas of the Great Lakes system. At the present time a total of over 1000 tests have been run by the City of Chicago's Water Purification Laboratory covering samples taken from Lake Michigan from the Wisconsin Line to the Michigan Line. The surveys included the North Lake Survey, South Lake Survey, North Harbor Survey, Mouth of the Chicago River, Navy Pier and the Calumet-Indiana Harbor Ship Canal Survey. In addition, many raw water samples were tested at Central, South, and Hammond intakes and outlet (treated) waters were tested from Hammond, 73rd and 79th Street outlets of SWFP, and North and Central outlets from CWFP. All samples were below the 0.1 ppb value for mercury.

Tests prior to August 21, 1970 were reported on a detectable limit of 0.5 ppb. Tests on and after August 22 through December 1970 (275 determinations) reported mercury below 0.1 ppb, which is less than 0.1 microgram per liter. Therefore, based on our tests, the southern end of Lake Michigan can be stated to be free of mercury contamination at the present time.

Costs

By observing Table 6 it can be seen that the required dosage of activated carbon, coagulants and chlorine,while less in 1969 than in the previous five years,was remarkably reduced in 1970. There have been a number of days, even weeks, in which no activated carbon was used at either plant. While the average coagulant dosage for 1970 was 10 ppm, there were periods of 2.5 to 5 ppm dosages. The chlorine demand of the water has often been less than 1.0 ppm for the first time in the history of the South Water Filtration Plant. All of this is reflected in the costs of chemical treatment as shown in Table 7. While there have been steady increases in the prices paid for chemicals, the total cost of chemical treatment had steadily declined as shown in Table 8.

Conclusion

From the plant operator's viewpoint there has been a measurable and continued improvement in water quality of Lake Michigan at Chicago. This improvement started in 1969 and has continued through 1970, resulting in considerable reduction in difficulty and cost of water treatment. Most of the measured parameters of water quality have shared in this improvement.

Two sorts of water quality parameters, however, do not fit this pattern. One group, related to the burden of dissolved solids, has showed a continuous increase in concentration, perhaps even at an increasing rate. The other group, consisting of algal nutrients, shows no improvement. In the case of phosphate, there is evidence that the improvement observed in 1969 has been lost, and that further increases in phosphate concentration have occurred in 1970. Furthermore, it may at least be conjectured that concentrations of phosphate in the relatively shallow waters of Lake Michigan from which water supplies are drawn are tending toward an equilibrium concentration which is well above the threshold concentration for nuisance algal growth.

The City of Chicago has always taken an aggressive position in abating pollution of the Southern end of Lake Michigan and in maintaining the best possible quality of water supplied to the consuming public. An early step in this direction was the establishment in 1888 of what is now known as the Metropolitan Sanitary District of Greater Chicago for the purpose of taking Chicago's sewage out of Lake Michigan. This has been accomplished. Again in 1924 the Water Purification Division was established to keep tight control over Water Quality. (Since 1923 there has not been a single death from Typhoid fever in Chicago that is attributable to its water supply). Regular surveys of the Southern end of Lake Michigan and its tributaries have been carried out since 1926. Chicago's reports on Water Quality have been the basis of may conferences and enforcement acts.

The City recently passed an ordinance banning the use of Phosphates in detergents sold in the City after July 1, 1972. The Mayor of Chicago, the Honorable Richard J. Daley, said in a T.V. interview on March 11, 1971, "The use of Treatment chemicals in Chicago's water supply has been substantially reduced during the past year (1970). However, this doesn't mean the lake has been saved, but the trend is in the right direction". However, Chicago will continue its policy of intensive surveillance over the quality of water in its Southern end of Lake Michigan.

TABLE 2

SUMMARY OF "OIL REFINERY WASTE" TYPE ABNORMAL ODOR PERIODS IN RAW LAKE WATER SUPPLY TO SOUTH WATER FILTRATION PLANT
1950-1970

			Maximum Threshold Odors During Periods			Maximum Activated Carbon Dosage Applied lb/mil gal
Year	Odor Periods	Total Odor Days	4-20	21-50	51-100	
1950	10	36	6	3	1	1158
1951	20	127	16	4	-	446
1952	17	30	16	1	-	590
1953	16	18	16	-	-	266
1954	12	23	11	1	-	356
1955	15	36	15	-	-	279
1956	13	28	12	1	-	415
1957	18	49	18	-	-	325
1958	17	43	16	1	-	503
1959	19	40	17	2	-	712
1960	21	42	20	1	-	324
1961	23	94	23	-	-	388
1962	23	76	23	-	-	270
1963	28	72	27	1	-	680
1964	28	89	27	-	1	745
1965	15	46	14	1	-	320
1966	26	95	25	1	-	385
1967	21	89	20	1	-	557
1968	22	57	17	1	-	411
1969	15	42	13	1	-	557
1970	8	18	8	-	-	213

Bureau of Water, Department of Water and Sewers, City of Chicago

TABLE 3

SUMMARY OF MAXIMUM AMMONIA NITROGEN IN INTAKE WATER SUPPLY, AND ACTIVATED CARBON AND CHLORINE APPLIED DURING ABNORMAL ODOR POLLUTION PERIODS SOUTH WATER FILTRATION PLANT, 1950-1970

Year	Maximum Ammonia Nitrogen (ppm)	Maximum Activated Carbon Dosage (lb/mil gal)	Maximum Chlorine Dosage (lb/mil gal)
1950	0.276	1158	84.0
1951	0.196	446	45.5
1952	0.248	590	45.1
1953	0.120	266	35.4
1954	0.148	356	20.8
1955	0.125	279	24.3
1956	0.180	415	24.4
1957	0.248	325	26.8
1958	0.680	503	19.4
1959	0.290	712	24.5
1960	0.272	324	16.0
1961	0.358	388	20.3
1962	0.590	370	27.2
1963	0.230	680	42.8
1964	0.496	745	56.1
1965	0.198	320	53.1
1966	0.260	385	53.9
1967	0.260	557	70.0
1968	0.250	411	51.1
1969	0.250	557	37.8
1970	0.140	213	39.0

Bureau of Water, Department of Water and Sewers, City of Chicago

TABLE 4

SUMMARY OF ACTIVATED CARBON APPLIED
FOR REMOVAL OF ODORS IN LAKE WATER
SOUTH WATER FILTRATION PLANT
1950-1970

Year	Total Activated Carbon Applied (lbs)	Average Carbon Dosage (lb/mil gal)	Maximum Hourly Carbon Dosage During Odor Periods (lb/mil gal)
1950	2,874,905	26	1158
1951	3,545,552	31	446
1952	3,203,426	26	590
1953	1,775,063	14	266
1954	2,011,359	16	356
1955	2,057,781	17	279
1956	1,981,108	16	415
1957	3,032,729	24	325
1958	2,762,540	22	503
1959	3,035,509	23	712
1960	2,727,005	21	324
1961	2,632,923	21	388
1962	2,865,541	22	370
1963	3,194,443	23	680
1964	3,773,655	27	745
1965	3,094,606	23	320
1966	4,678,661	33	385
1967	4,455,273	32	557
1968	4,879,309	33	411
1969	2,542,600	18	557
1970	1,535,500	11	213

Bureau of Water, Department of Water and Sewers, City of Chicago

LEGEND:
≯ Not more than
≮ Not less than

TABLE 5
CONTROL POINT - OPEN WATER
SOUTH WATER FILTRATION PLANT
COMPARISON OF ACTUAL RESULTS WITH WATER QUALITY CRITERIA
1965-1970

PARAMETER	QUALITY CRITERIA		Exceeding Daily Average		Exceeding Single Value	
			1965-1969 Avg.	1970	1965-1969 Avg.	1970
Coliform Bacteria	Annual Avg.	≯ 200				
(MPN/100 ml)	Daily Avg.	≯2.500	2/364	0/363		
Fecal Streptococci						
(Number/100 ml)	Single Day	≯ 25			7/294	5/359
True Color	Annual Avg.	≯ 5				
(Units)	Single Day	≯ 15			0/240	0/365
Threshold Odor	Single Value	≯ 8			17/365	
	Daily Avg.	≯ 4	27/365	26/365		0/365
Temperature (°F)	Single Day	≯ 85			0/356	0/365
pH	Annual Range	8.1-8.4				
(Units)	Daily Range	7.7-9.0	0/365	0/365		
Dissolved Oxygen	Annual Avg.	≮ 90				
(Percent Saturation)	Single Day	≮ 80			1/10	1/52
Ammonia Nitrogen	Annual Avg.	≯ 0.02				
(mg/1)	Daily Avg.	≯ 0.05	34/365	1/365		
Methylene Blue Active	Annual Avg.	≯ 0.05				
Substance (mg/1)	Single Day	≯ 0.20			0/95	0/166
Chlorides	Annual Avg.	≯ 8 (9)				
(mg/1)	Single Day	≯ 15			0.2/289	6/364
Cyanides (mg/1)	Single Day	≯ 0.025			0/28	0/53
Fluorides	Annual Avg.	≯ 1.0				
(mg/1)	Single Day	≯ 1.3			0.2/315	0/365
Dissolved Iron	Annual Avg.	≯ 0.15				
(mg/1)	Single Day	≯ 0.30			0/283	0/365
Phenol Like Substances	Annual Avg.	≯ 0.001				
(mg/1)	Single Day	≯ 0.003			60/233	4/354
Sulfates	Annual Avg.	≯ 23 (24)				
(mg/1)	Single Day	≯ 50			0/297	22/351
Total Phosphates	Annual Avg.	≯ 0.03				
(mg/1)	Single Day	≯ 0.04			144/299	263/365
Filterable Residue	Annual Avg.	≯ 162 (165)				
(mg/1)	Single Day	≯ 200			0.6/143	66/270

Number of days exceeding criteria/Number of days tested

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TABLE 6

Annual Consumption of Activated Carbon, Coagulants (Alum, Ferrous Sulfate), and Chlorine
1965-1970

	Activated Carbon		Coagulants		Chlorine		Total Water Treated
Year	Total lb.	lb/milgal	Total lb.	lb/milgal	Total lb.	lb/milgal	(milgal)
1965	3,094,606	23	14,279,870	104	2,797,986	20.4	136,895
1966	4,678,661	33	16,445,820	116	3,518,720	24.8	142,084
1967	4,455,273	32	15,778,872	112	3,388,261	24.0	141,107
1968	4,876,309	33	15,907,820	109	3,215,810	21.3	146,166
1969	2,542,600	18	14,701,900	104	2,969,600	21.0	141,779
1970	1,535,500	11	12,105,800	84	2,571,000	17.8	144,826
Total	21,182,949		89,220,082		18,461,377		852,857
Average	3,530,491	25	14,870,014	105	3,076,896	21.6	

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TABLE 7

Summary of Costs: Activated Carbon, Coagulants (Alum, Ferrous Sulfate), and Chlorine 1965-1970

Year	Activated Carbon		Coagulants		Chlorine	
	Total	$/milgal	Total	$/milgal	Total	$/milgal
1965	$ 243,055	$1.78	$ 268,807	$1.96	$122,776	$0.90
1966	361,222	2.54	303,788	2.14	162,471	1.14
1967	368,914	2.61	293,547	2.08	167,048	1.18
1968	415,789	2.86	304,206	2.07	146,122	1.00
1969	224,134	1.58	263,900	1.86	143,098	1.01
1970	135,496	0.93	236,621	1.63	126,275	0.87
Total	$1,748,610		$1,670,869		$867,790	
Average	$ 291,435	$2.05	$ 278,478	$1.96	$144,631	$1.02

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TABLE 8

CONTRACT PRICES PER TON
Central & South Water Filtration Plants
1965-1970

Year	Chemical Alum (Soln)	 Carbon	 Chlorine
1965	$39.07	$156.18	$96.74
1966	40.55	156.70	95.20
1967	41.85	166.60	97.20
1968	43.45	178.00	93.40
1969	43.75 *	173.00 *	95.40 *
1970	43.93 *	173.00 *	98.50 *

* average

TOTAL CHEMICAL COSTS
Central & South Water Filtration Plants
1966-1970

Year	Pumpage/mil gal	Total $	$/mil gal
1966	391,682	2,394,888	6.12
1967	393,656	2,466,374	6.27
1968	388,125	2,299,421	5.92
1969	385,775	2,177,808	5.65
1970	391,814	2,039,573	5.21

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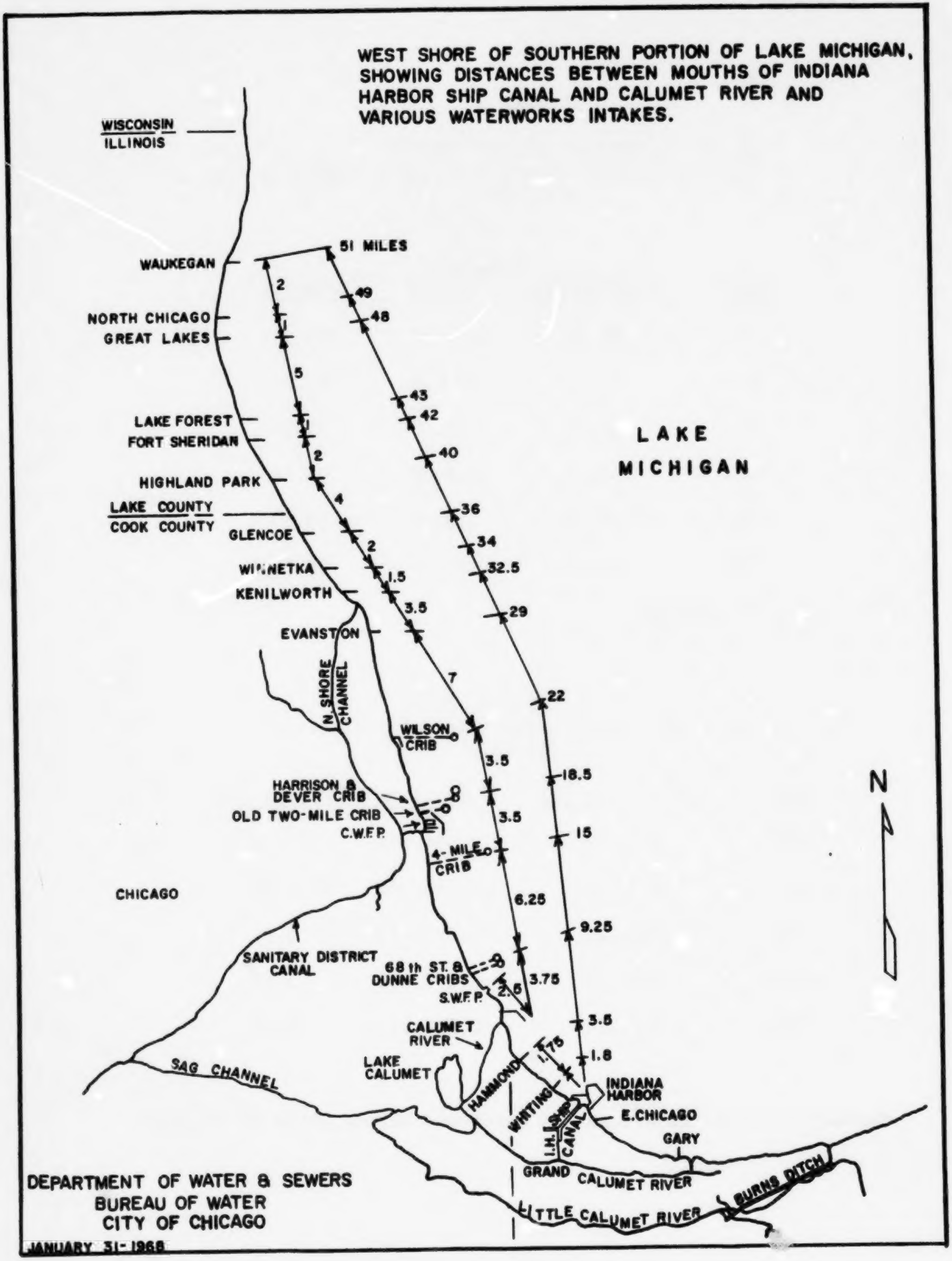
FIGURE I



WEST SHORE OF SOUTHERN PORTION OF LAKE MICHIGAN, SHOWING DISTANCES BETWEEN MOUTHS OF INDIANA HARBOR SHIP CANAL AND CALUMET RIVER AND VARIOUS WATERWORKS INTAKES.

DEPARTMENT OF WATER & SEWERS
BUREAU OF WATER
CITY OF CHICAGO

JANUARY 31-1966

AVERAGE COLIFORM PER 100 ml SOUTH WATER FILTRATION PLANT INTAKE

1950 - 1970

YEAR	COLIFORM PER 100 ml	
	ANNUAL AVERAGE	MAXIMUM DAY
1950		
1951	14.0	375
1952	9.7	495
1953	13.9	534
1954	20.0	959
1955	42.3	1300
1956	38.7	1400
1957	70.8	9600
1958	63.1	6400
1959	85.6	3200
1960	65.2	2900
1961	52.4	3000
1962	69.5	1700
1963	200.8	5800
1964	110.2	1900
1965	46.3	1100
1966	35.8	1200
1967	260.0	13000
1968	82.0	2400
1969	68.0	980
1970	20.0	670

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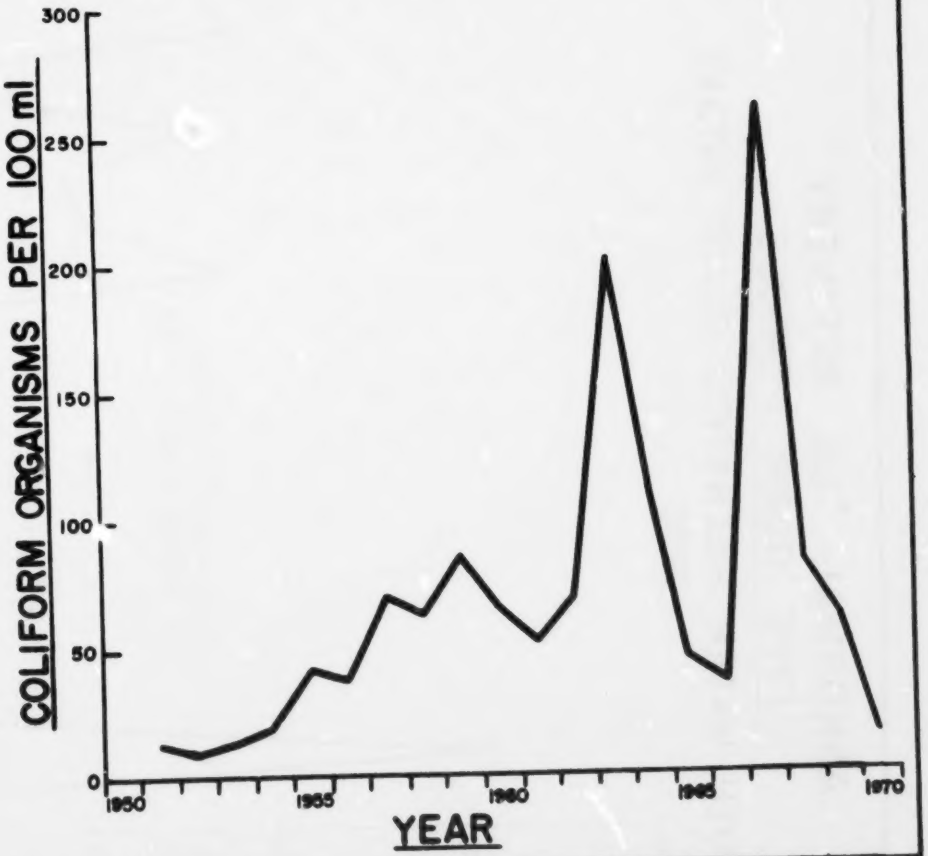
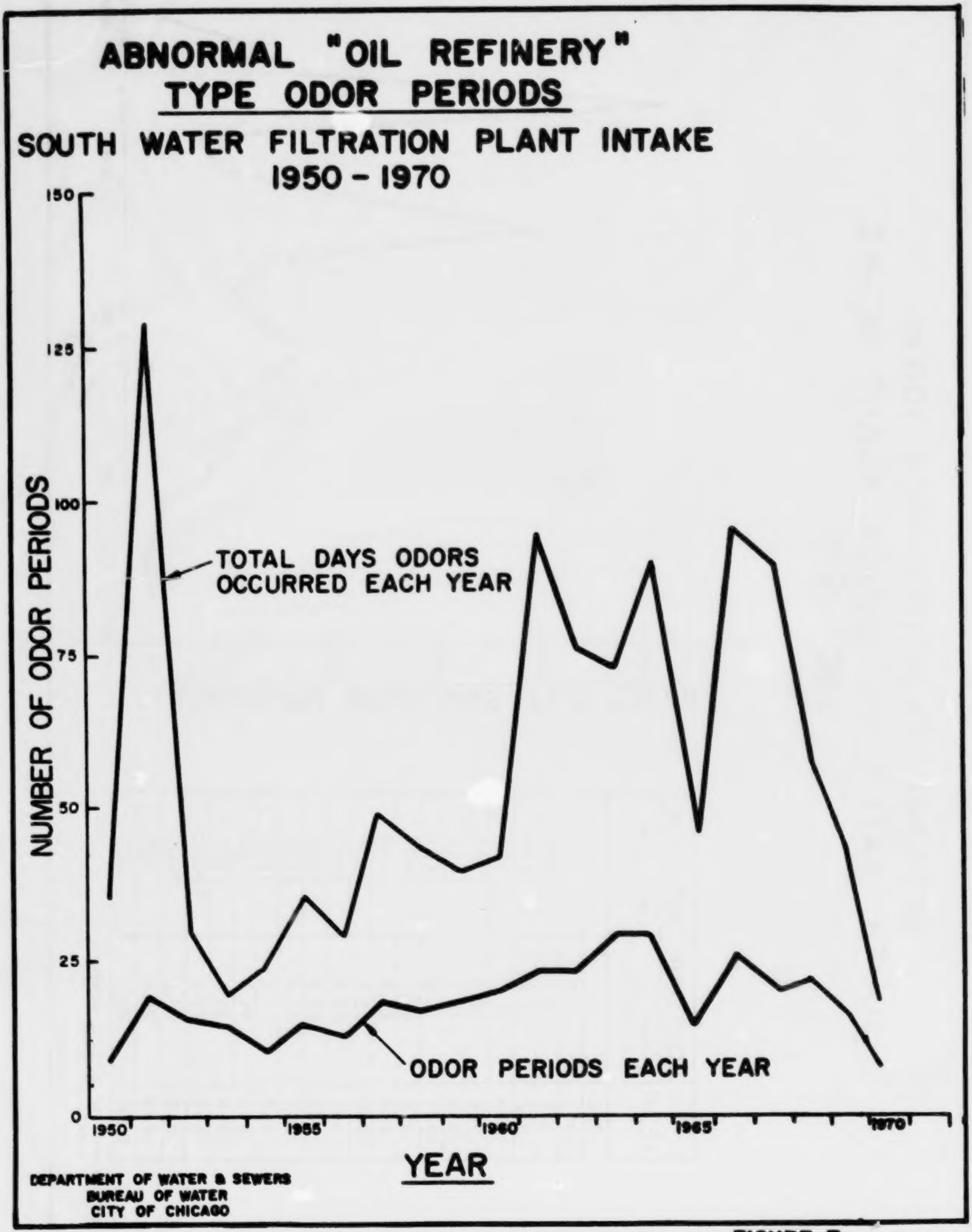


FIGURE 2



ABNORMAL "OIL REFINERY" TYPE ODOR PERIODS

SOUTH WATER FILTRATION PLANT INTAKE 1950 - 1970

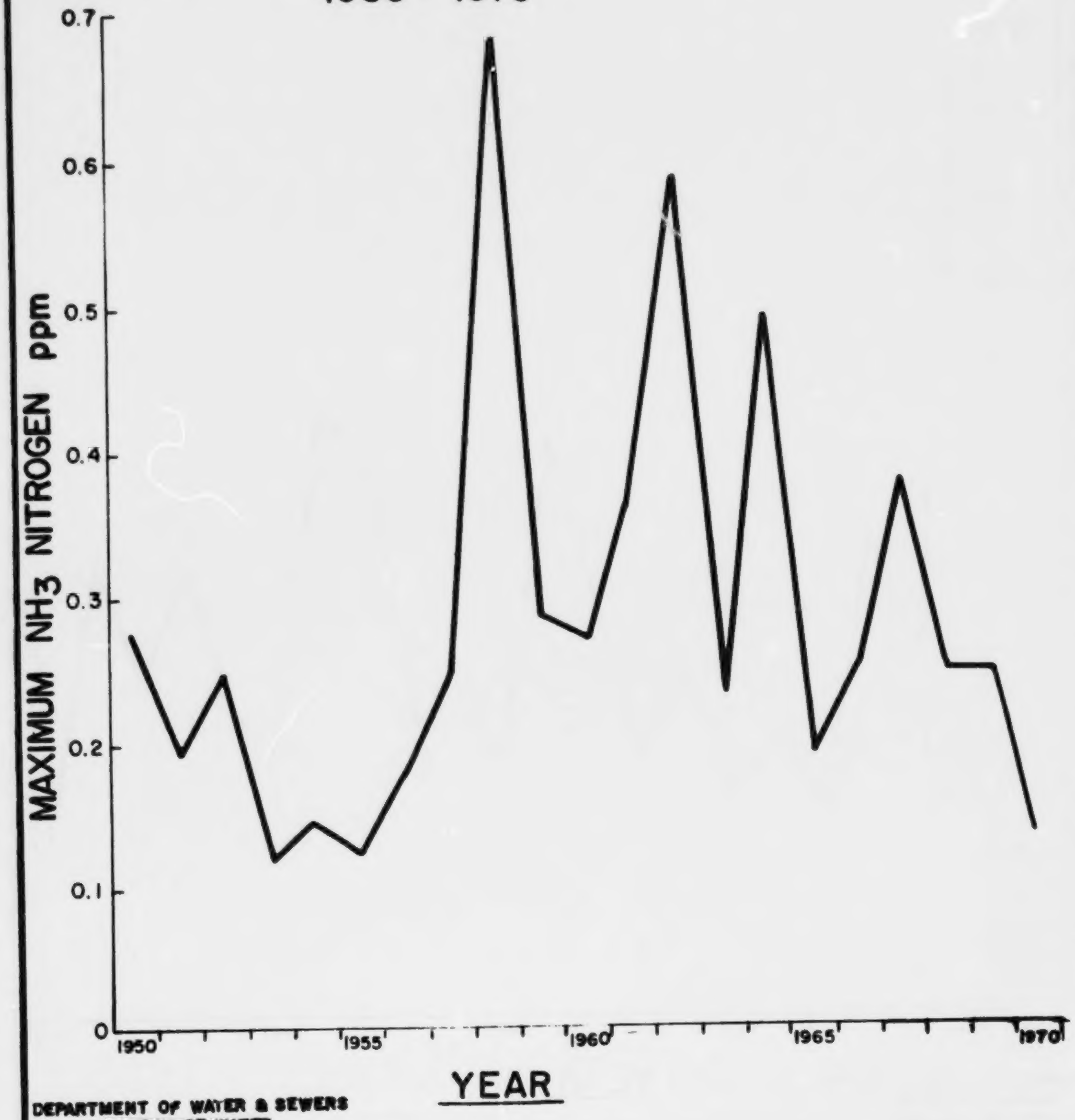
DEPARTMENT OF WATER & SEWERS
BUREAU OF WATER
CITY OF CHICAGO

FIGURE 3

FIGURE 4

MAXIMUM AMMONIA NITROGEN DURING ABNORMAL "OIL REFINERY" TYPE ODOR PERIODS

SOUTH WATER FILTRATION PLANT INTAKE
1950 – 1970



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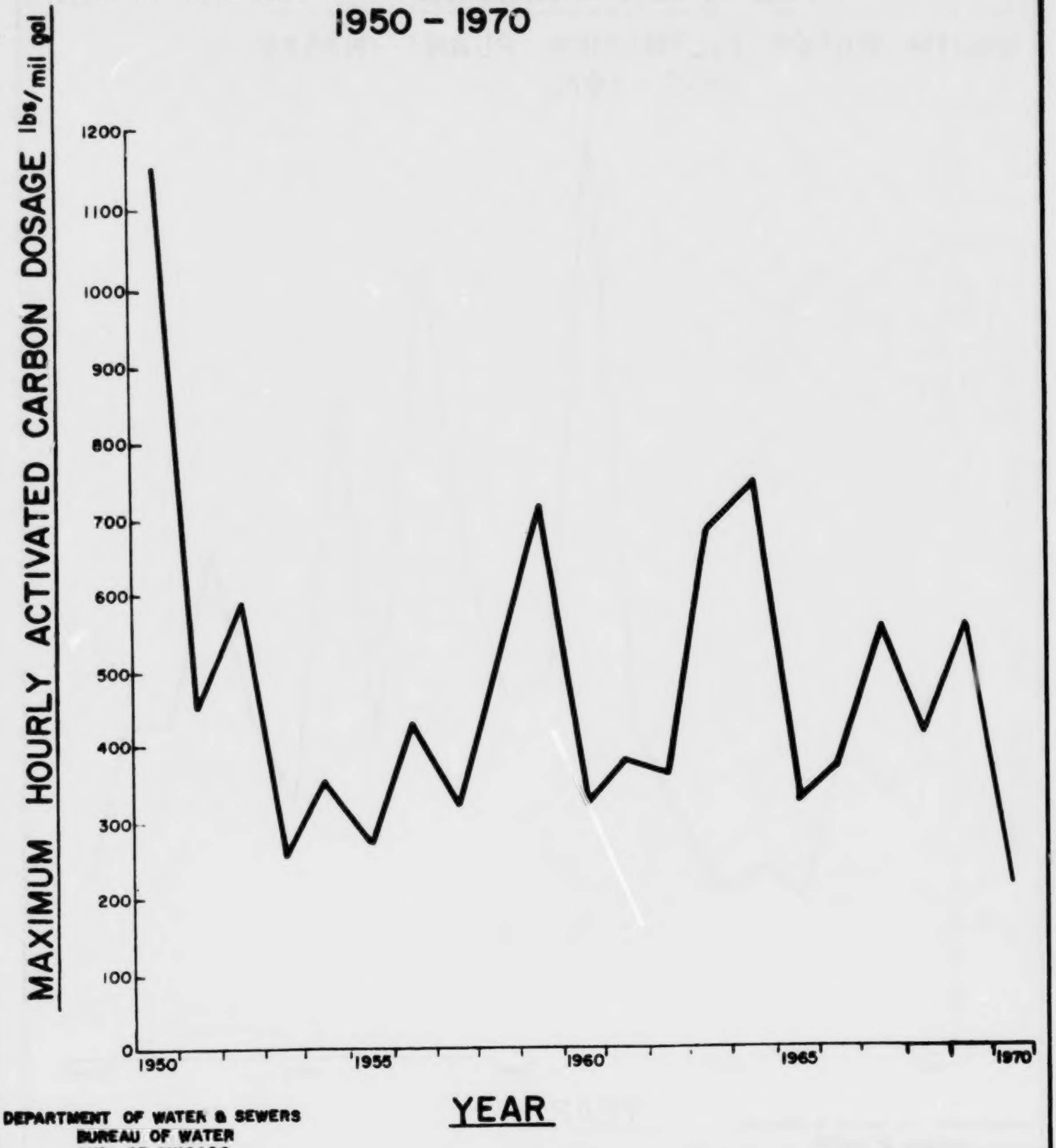
CITY OF CHICAGO

FIGURE 5

MAXIMUM ACTIVATED CARBON DOSAGE DURING ABNORMAL "OIL REFINERY" TYPE ODOR PERIODS

SOUTH WATER FILTRATION PLANT INTAKE

1950 - 1970



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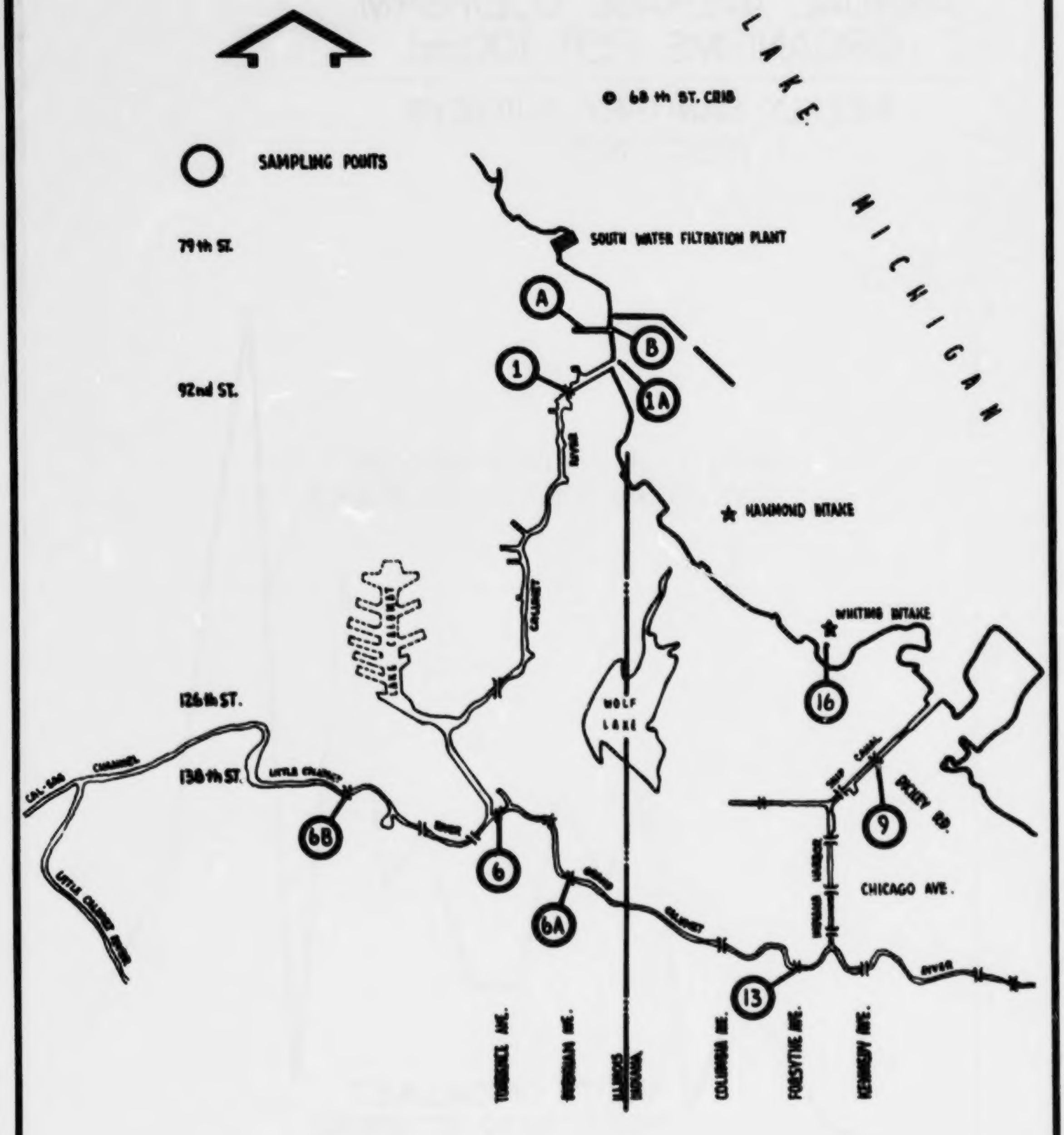
CITY OF CHICAGO

WEEKLY POLLUTION SURVEYS - LOCATION OF SAMPLING POINTS



CITY OF CHICAGO
DEPARTMENT OF WATER AND SEWERS

FIGURE 6

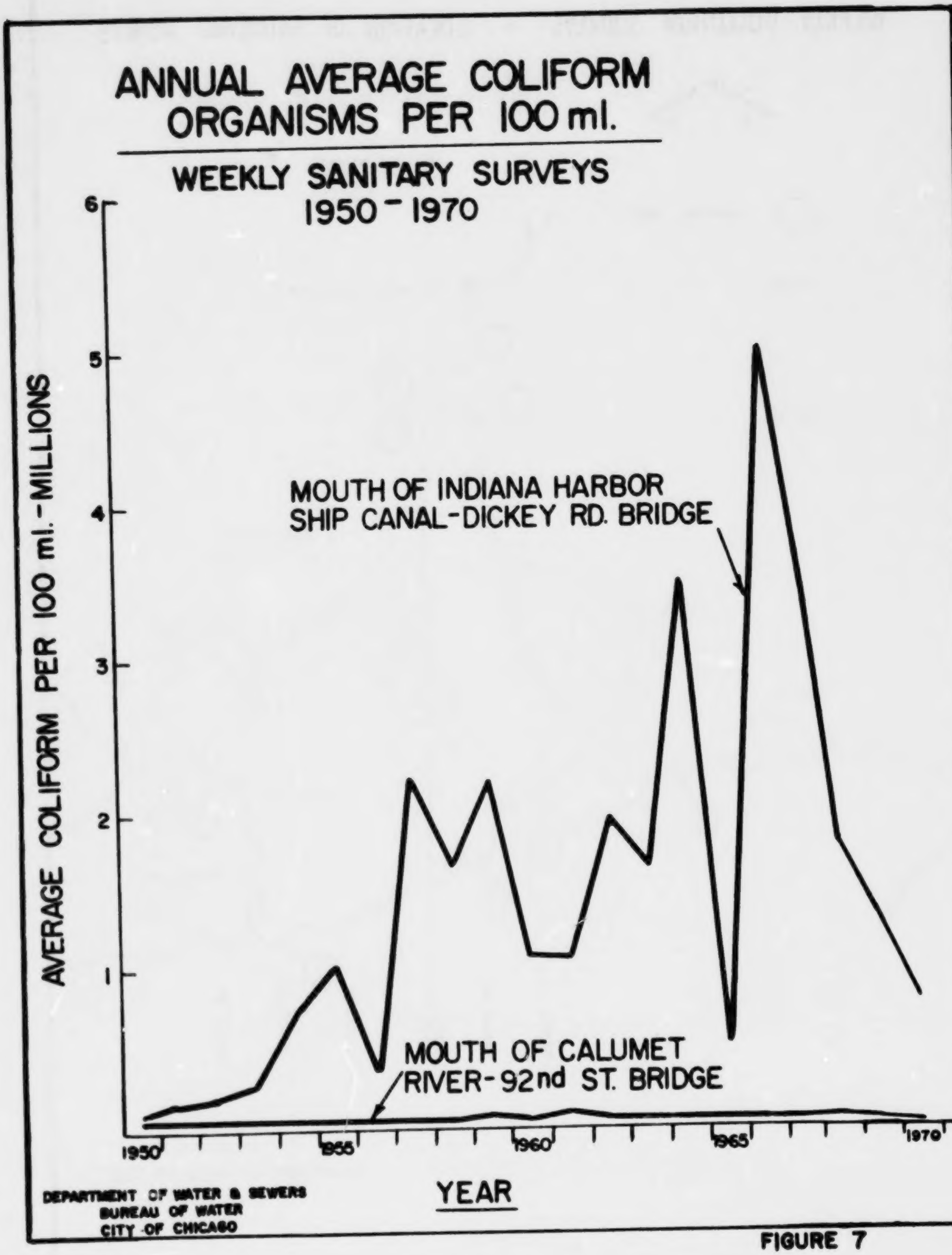

ANNUAL AVERAGE COLIFORM ORGANISMS PER 100 ml.
WEEKLY SANITARY SURVEYS 1950 - 1970
AVERAGE COLIFORM PER 100 ml. - MILLIONS
6
5
4
3
2
1
MOUTH OF INDIANA HARBOR SHIP CANAL - DICKEY RD. BRIDGE
MOUTH OF CALUMET RIVER - 92nd ST. BRIDGE
1950
1955
1960
1965
1970
YEAR
DEPARTMENT OF WATER & SEWERS
BUREAU OF WATER
CITY OF CHICAGO

FIGURE 7

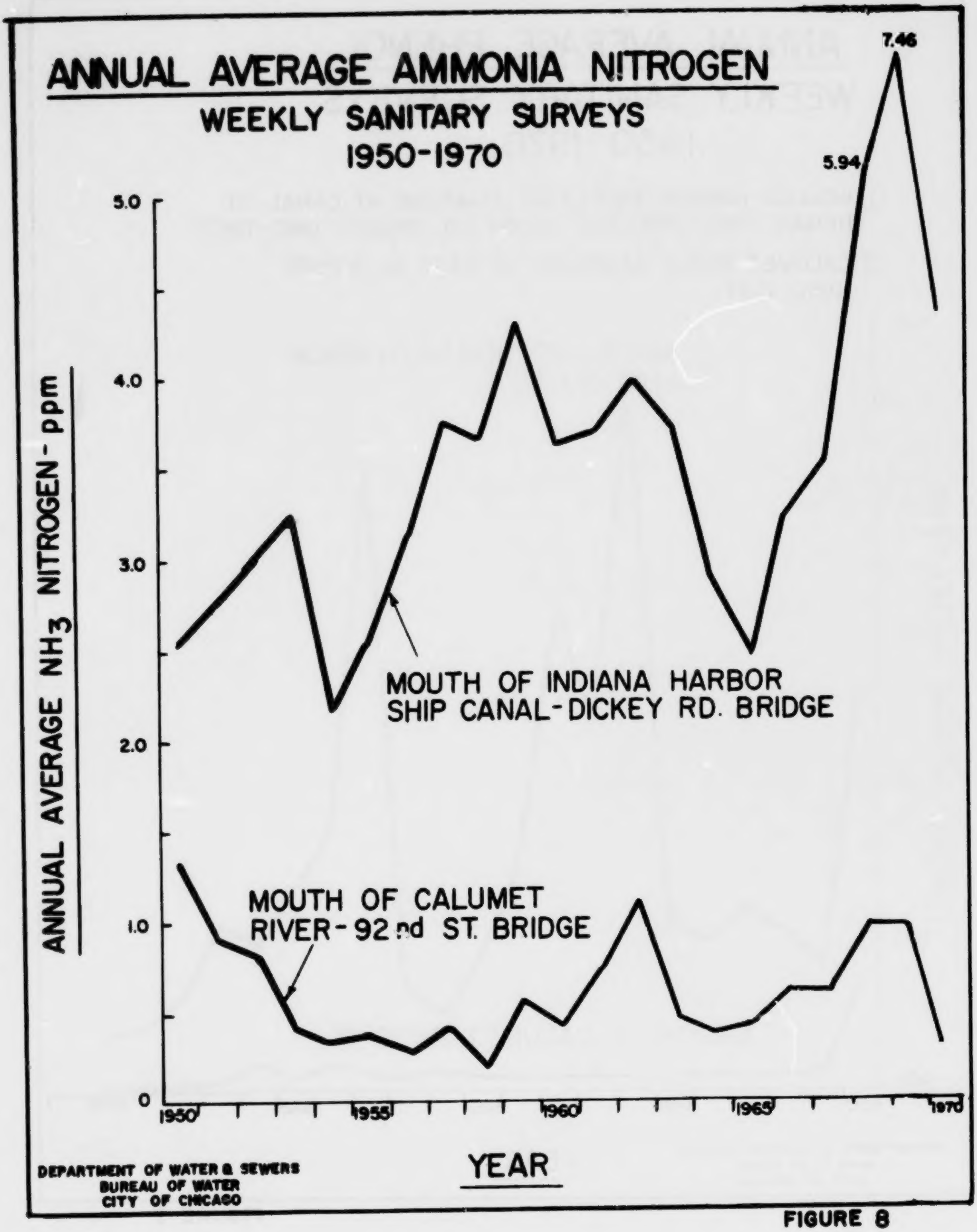
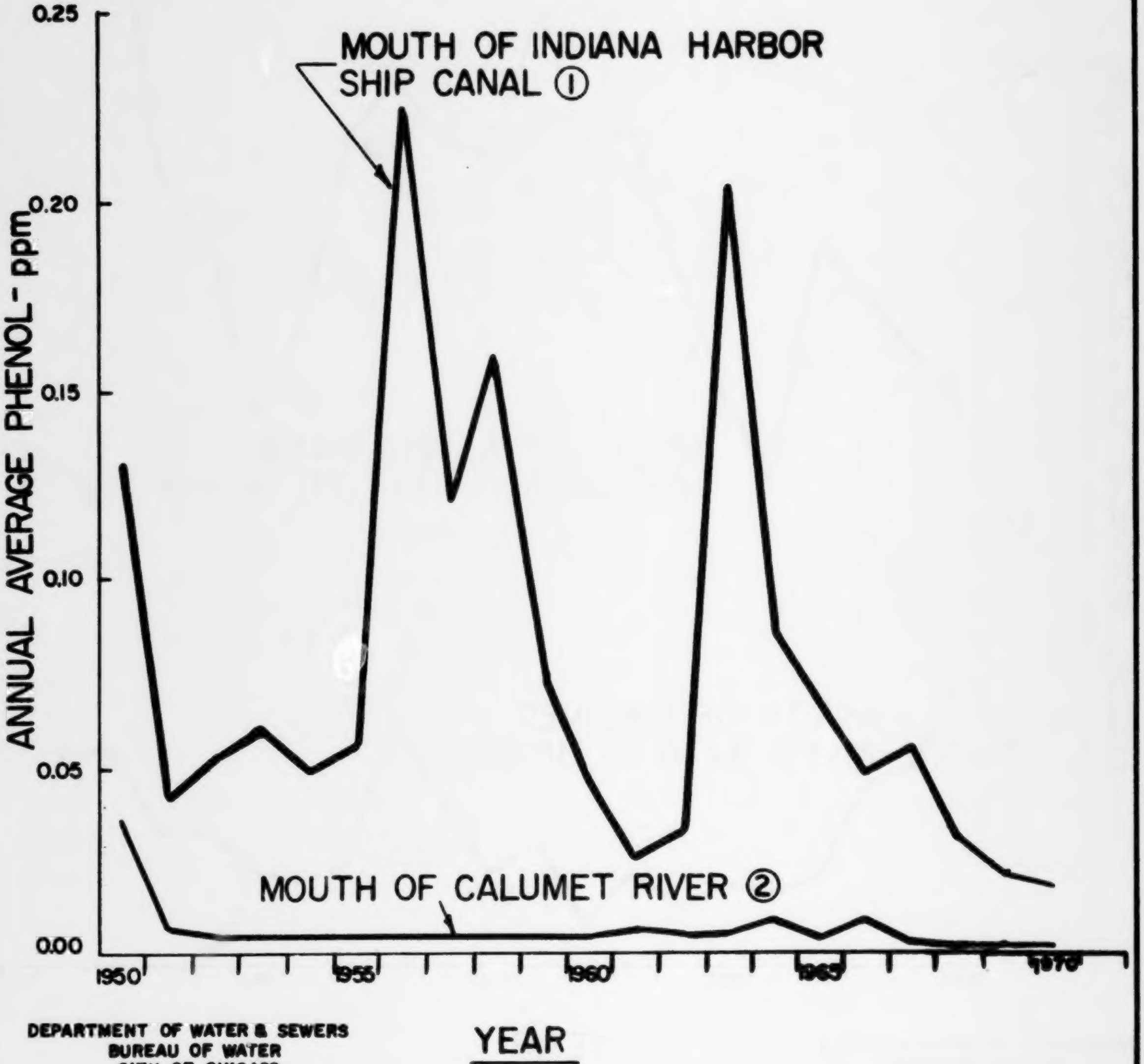

ANNUAL AVERAGE AMMONIA NITROGEN
WEEKLY SANITARY SURVEYS
1950-1970
ANNUAL AVERAGE NH_3 NITROGEN - ppm
5.0
4.0
3.0
2.0
1.0
0
7.46
5.94
MOUTH OF INDIANA HARBOR SHIP CANAL-DICKEY RD. BRIDGE
MOUTH OF CALUMET RIVER-92nd ST. BRIDGE
1950
1955
1960
1965
1970
YEAR
DEPARTMENT OF WATER & SEWERS
BUREAU OF WATER
CITY OF CHICAGO

FIGURE 8



ANNUAL AVERAGE PHENOL
WEEKLY SANITARY SURVEYS
1950-1970

① INDIANA HARBOR SHIP CANAL SAMPLING AT CANAL ST. BRIDGE (1950-1959) AND DICKEY RD. BRIDGE (1960-1967)

② CALUMET RIVER SAMPLING AT 92nd ST. BRIDGE (1950-1967)

DEPARTMENT OF WATER & SEWERS
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CITY OF CHICAGO

FIGURE 9

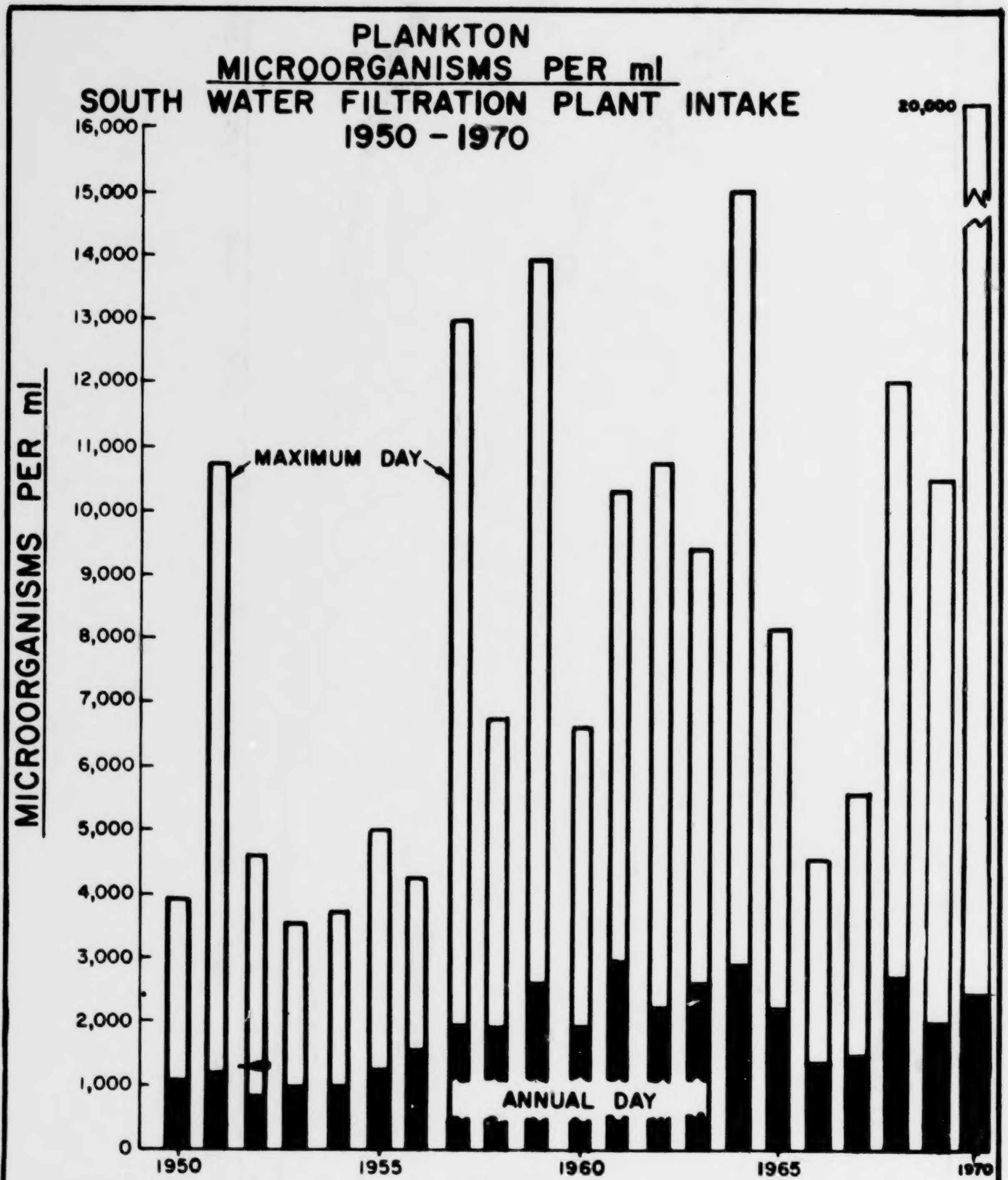

PLANKTON
MICROORGANISMS PER ml
SOUTH WATER FILTRATION PLANT INTAKE
1950 - 1970
MICROORGANISMS PER ml
16,000
15,000
14,000
13,000
12,000
11,000
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
20,000
MAXIMUM DAY
ANNUAL DAY
1950
1955
1960
1965
1970
YEAR
DEPARTMENT OF WATER & SEWERS
BUREAU OF WATER
CITY OF CHICAGO

FIGURE 10

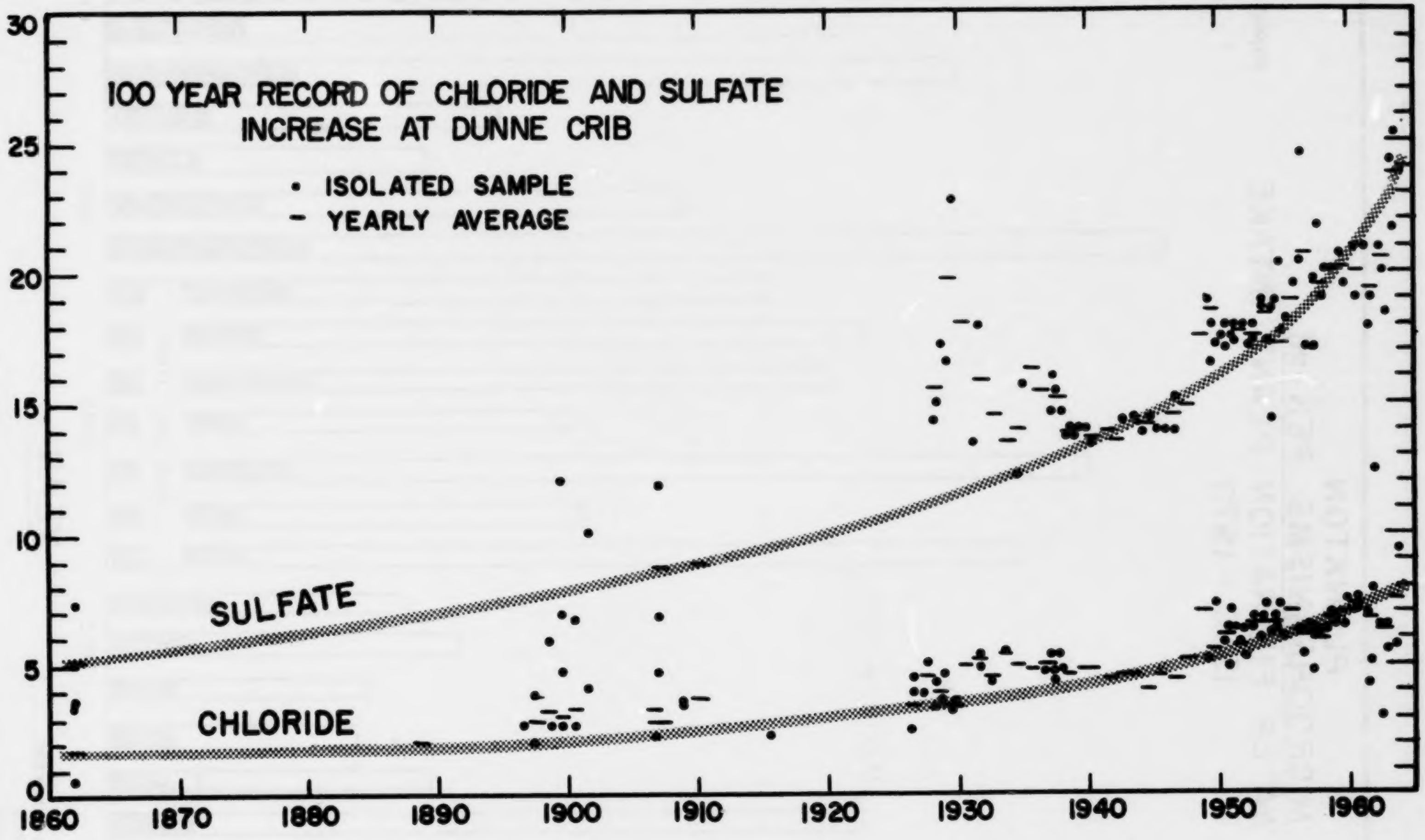

100 YEAR RECORD OF CHLORIDE AND SULFATE
INCREASE AT DUNNE CRIB
• ISOLATED SAMPLE
– YEARLY AVERAGE
SULFATE
CHLORIDE
ppm
0
5
10
15
20
25
30
1860
1870
1880
1890
1900
1910
1920
1930
1940
1950
1960

FIGURE 11

45 YEAR RECORD OF CHLORIDE AND SULFATE
INCREASE AT DUNNE CRIB

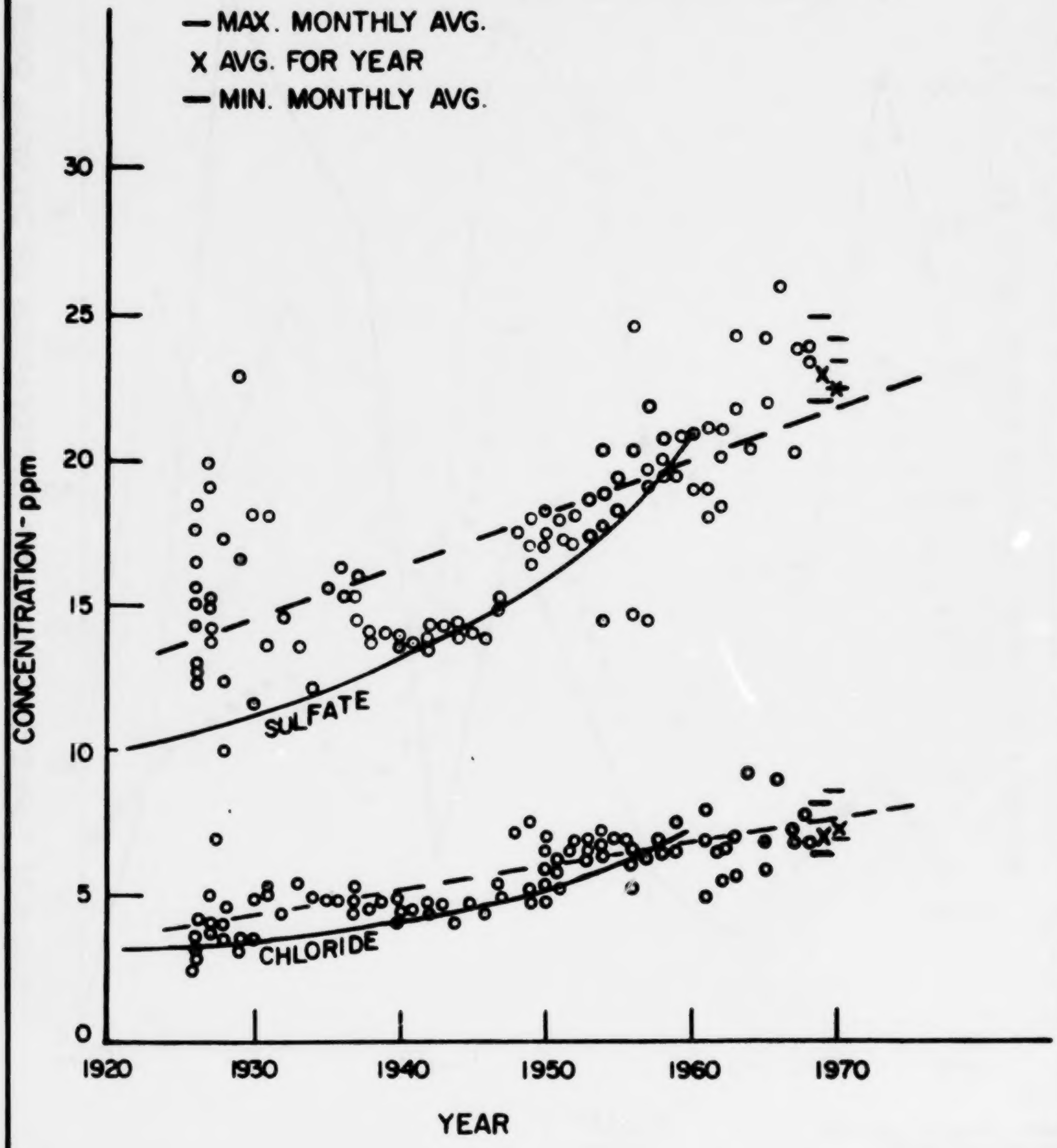
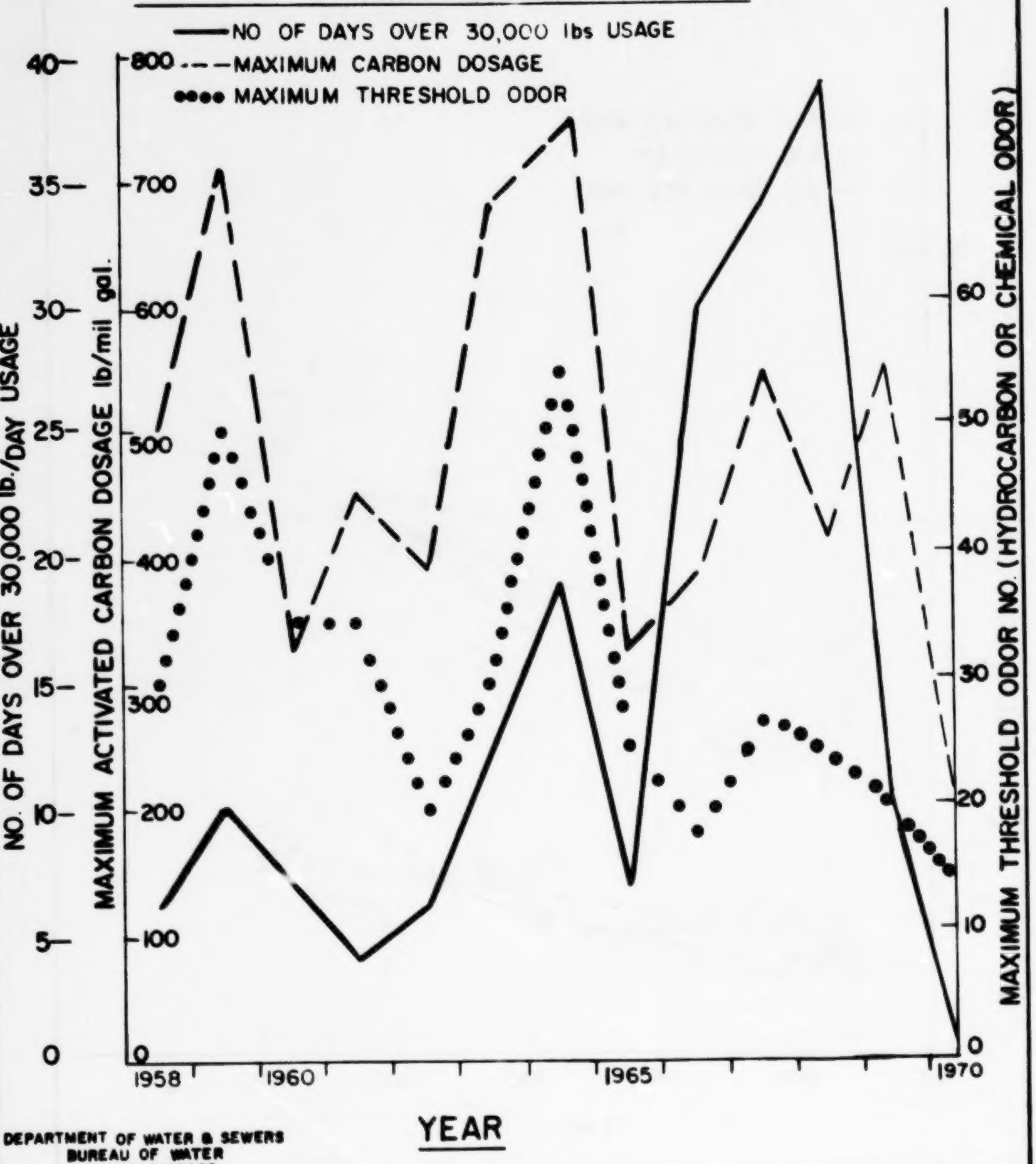


FIGURE 12

MAXIMUM ACTIVATED CARBON USAGE
SOUTH WATER FILTRATION PLANT
1958 - 1970



DEPARTMENT OF WATER & SEWERS
BUREAU OF WATER
CITY OF CHICAGO

FIGURE 13

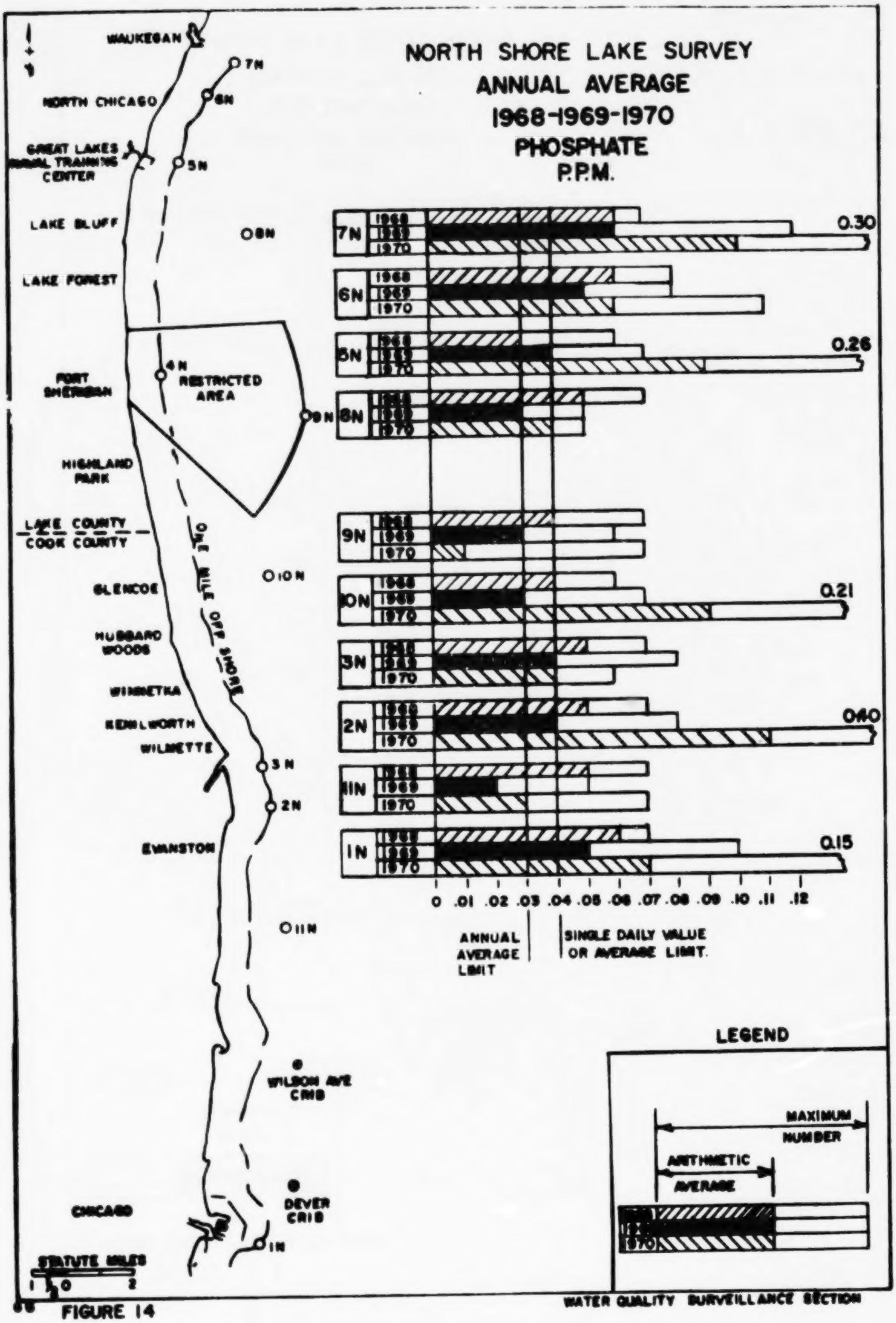


FIGURE 14

WATER QUALITY SURVEILLANCE SECTION

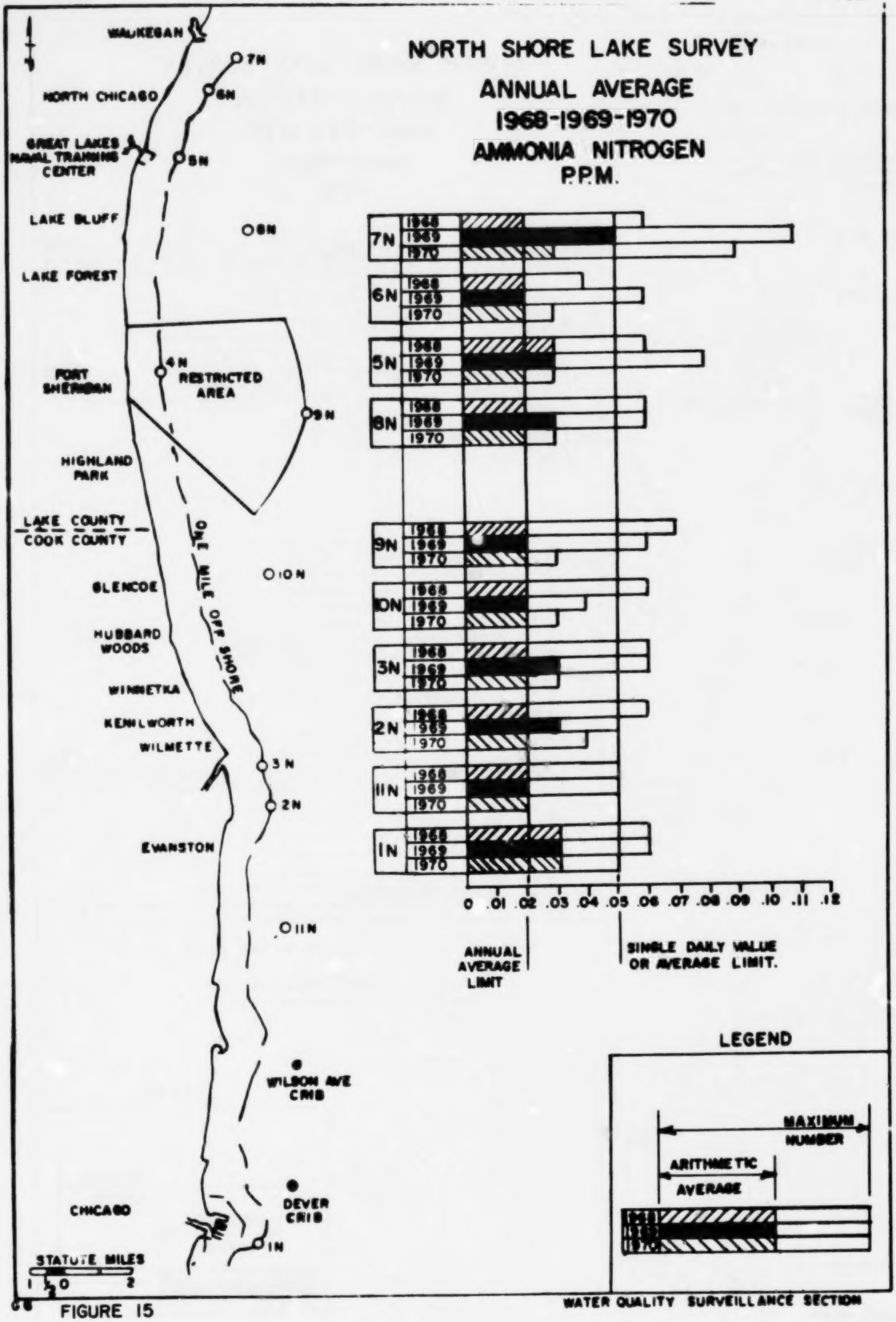


FIGURE 15

WATER QUALITY SURVEILLANCE SECTION

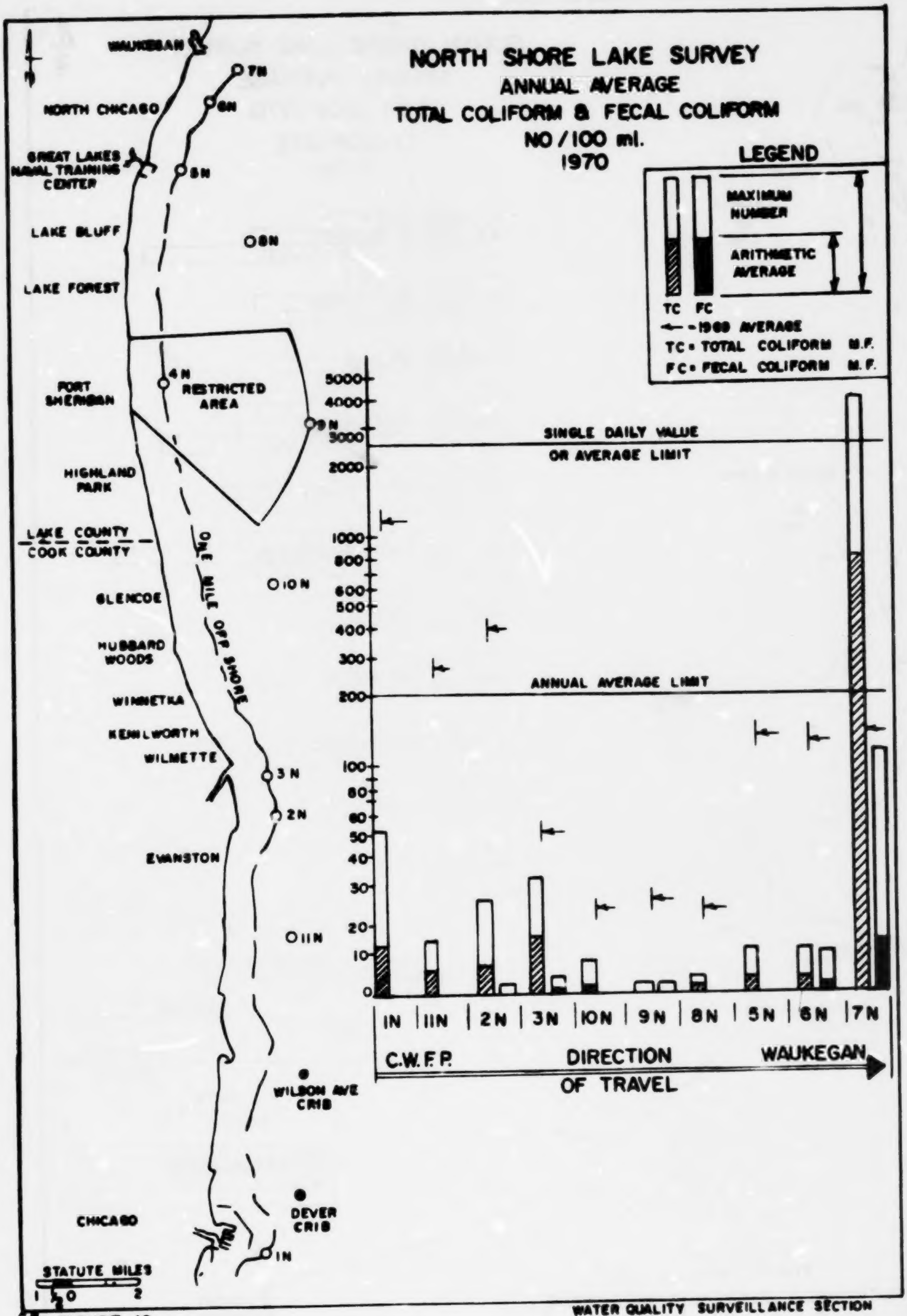


FIGURE 16

WATER QUALITY SURVEILLANCE SECTION

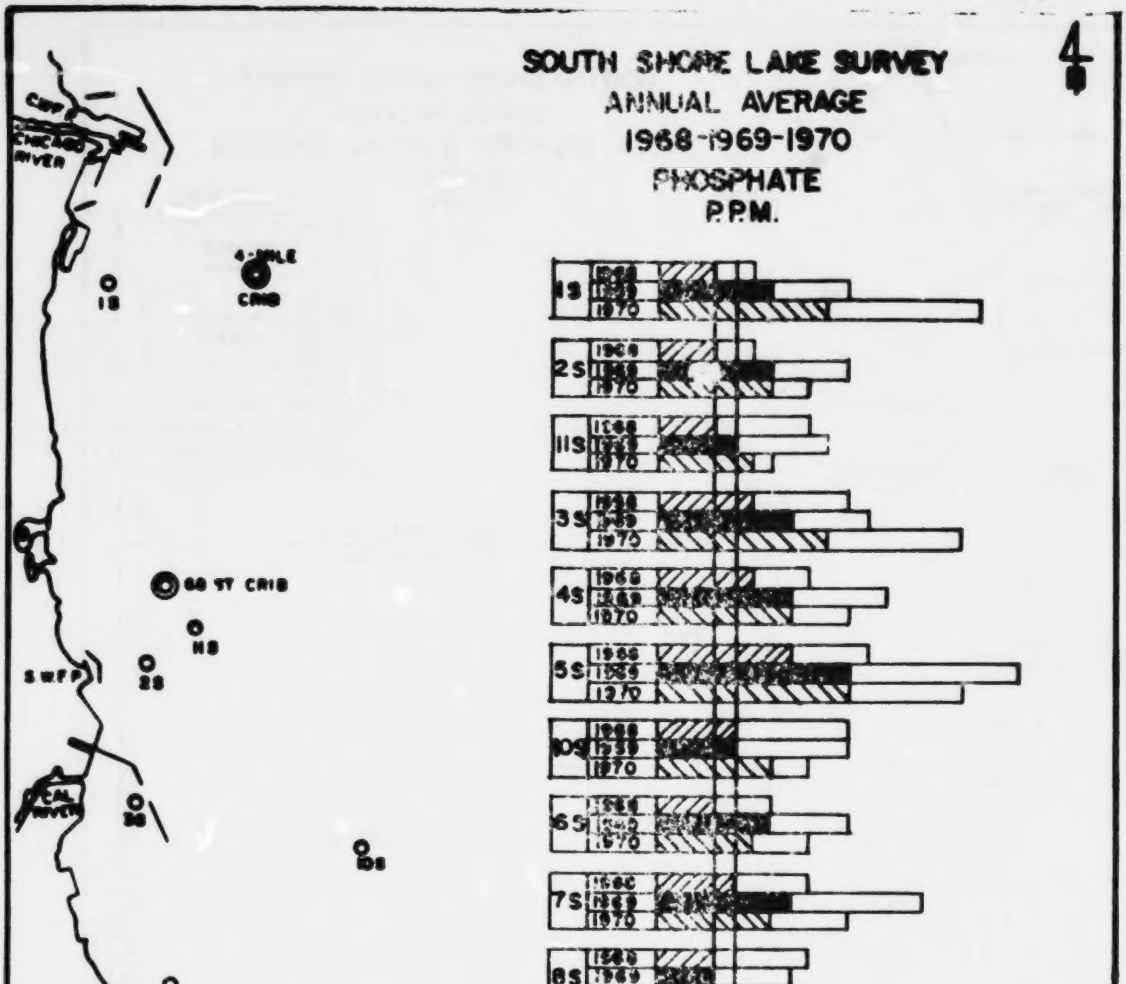


FIGURE 17

WATER QUALITY SURVEILLANCE SECTION

MR. VAUGHN: In the past 3 years, the lake has been getting better in many ways, and generally quite better. The chlorides continue to increase; the sulphates continue to increase, greater than the projected rate. The phosphates and the nitrogen compounds continue to increase and, of course, the total dissolved solids that are reflecting the chlorides and sulphate increase have continued to increase and the plankton counts continue to increase, and we still have the year-round plankton nuisances.

I have, in the face of continued rise in chemical cost -- the costs of chemicals purchased -- the total chemical costs have steadily declined -- gone down from $6.27 a million gallons in 1967 to $5.21 in 1970.

So I will now read my conclusion: From the plant operator's viewpoint there has been a measurable and continued improvement in water quality of Lake Michigan at Chicago. This improvement started in 1969 and has continued through 1970, resulting in considerable reduction in difficulty and cost of water treatment. Most of the measured parameters of water quality have shared in this improvement.

Two sorts of water quality parameters, however, do not fit this pattern. One group, related to the burden of dissolved solids, has showed a continuous increase in concentration, perhaps even at an increasing rate. The other group, consisting of algal nutrients, shows no improvement. In the case of phosphate, there is evidence that the improvement observed in 1969 has been lost, and that further increases in phosphate concentration have occurred in 1970. Furthermore, it may at least be conjectured that concentrations of phosphate in the relatively shallow waters of Lake Michigan from which water supplies are drawn are tending toward an equilibrium concentration which is well above the threshold concentration for nuisance algal growth.

The city of Chicago has always taken an aggressive position in abating pollution of the southern end of Lake Michigan and in maintaining the best possible quality of water supplied to the consuming public. An early step in this direction was the establishment in 1888 of what is now known as the Metropolitan Sanitary District of Greater Chicago for the purpose of taking Chicago's sewage out of Lake Michigan. This has been accomplished. Again in 1924 the Water Purification Division was established to keep tight control over water quality. (Since 1923 there has not been a single death from typhoid fever in Chicago that is attributable to its water supply.) Regular surveys of the southern end of Lake Michigan and its tributaries have been carried out since 1926. Chicago's reports on water quality have been the basis of many conferences and enforcement acts.

The city recently passed an ordinance banning the use of phosphates in detergents sold in the city after June 30, 1972. The Mayor of Chicago, the Honorable Richard J. Daley, said in a TV interview on March 11, 1971: "The use of treatment chemicals in Chicago's water supply has been substantially reduced during the past year (1970). However, this doesn't mean the lake has been saved, but the trend is in the right direction."

However, Chicago will continue its policy of intensive surveillance over the quality of water in its southern end of Lake Michigan.

Thank you, Mr. Chairman.

MR. STEIN: Thank you.

By the way, even though the hour is late, I am just going to take a minute, because I want to state my candid opinion. I know you are all involved in the thermal questions. But I think this is possibly as significant a report as we have had in this conference. This is what I want to point out, and I know Mr. Vaughn calls them as he sees them, and sometimes he has come in here, as you may know, with very dismal reports. He says, in general, the story is one of continuing improvement in water quality, but he points out some --

MR. MAYO: Excuse me, Mr. Chairman, the reporter is having difficulty because of the conversation.

(Whereupon, Mr. Stein sounded the gavel.)

MR. STEIN: -- he has pointed out some very specifics we have to get at, but I think his essential point is the most encouraging one.

When we started this program, we all had our fingers crossed and we were not sure we could turn the tide and we could make this go. I remember at one of our progress meetings, Mr. Vaughn came and it was at the time we had one of the popular Broadway plays "The Impossible Dream," and we didn't know whether we had an impossible dream or not.

But Mr. Vaughn, I think, with your painstaking report -- I think while we certainly are going to have to do a lot better because you pointed out where we are not catching up -- at least in the main it looks like we are on the right track, and we are improving the lake, This is encouraging indeed. This is something I want to thank all of you people here for. This is really --

MR. VAUGHN: One little facet of the thing which is not specific, on a recent trip to the crib in September, my assistant reported he was able to see to a depth of 15 feet for the first time in 30 years.

Thank you.

MR. MILLER: Mr. Chairman, I would like to take this opportunity to thank Mr. Vaughn and commend him for these reports. As he knows, and many of the others here also know, the work of the Chicago Water Department was pretty much the foundation of the Technical Committee's report from the 1965 conference, and the basis for the standards that were proposed by the Technical Committee, And it certainly is indeed gratifying to know that much of the work that has been done is now producing results and showing improvement at the South District filtration plant intake, and I certainly commend him for these reports.

I look at the tables in the back and it is most interesting to me to compare these, and while I realize these are from the Water Quality Surveillance Section and not from the Chicago Water Department, I believe -- is this correct?

MR. VAUGHN: The Water Quality Surveillance Section is a part of our Department.

MR. MILLER: This is a part of yours. That the phosphates and the nitrogen and ammonia nitrogen and the coliforms, when you compare them up and down the lake, would indicate that even some of those that are quite a ways north compared as far as Waukegan are as high or higher than those in some of the southern part of the lake, so that I think while we have done a job in the southern part of the lake that there still remains much to be done, and that certainly these results are indicative that we have a problem in the lake as a whole.

MR. STEIN: Thank you, again.

I want to join with that, because if it weren't for the Chicago Water Department surveys and the data that they had, we never could have mounted this program or had this cleanup in Lake Michigan. I know that while we said this again and again, I have never seen in the literature and the press or anywhere else that you people have gotten the recognition that you should have gotten, because we have found no such data, no such followup, and no such dedicated public servants checking on the water to see the results of what we have done anywhere in the country as we have in Chicago. You are indeed to be commended, and if I could give an award for citizens dedicated to clean water and being unsung heroes, you people in the

the Chicago Water Department would get it.

Thank you very much, Mr. Vaughn.

MR. VAUGHN: Thank you.

MR. CURRIE: I would like to second that, Mr. Chairman. I think that Mr. Vaughn's reports have been of inestimable value to the Conference and we are happy to have him here.

MR. STEIN: Thank you.

Are there any other citizens whom we have to hear from, having reports, or outside groups other than these technical committees who have been waiting?

MR. FRANGOS: Mr. Chairman, I have a statement from the city of Racine I would like to have entered into the record.

MR. STEIN: Without objection, this will be done.

(The above referred to statement follows in its entirety.)

city of RACINE ...racine, wisconsin

DEPARTMENT OF HEALTH — **G. P. Ferrazzano, M.D.**

March 18, 1971

City of Racine Statement to the Lake Michigan Enforcement Conference
March 23 & 24, 1971. Sherman House, Chicago, Illinois.

The City of Racine is concerned and interested in all discharges that enter Lake Michigan. The public awareness of mounting environmental problems in the United States, and specifically the deteriorating effect of waste entering Great Lakes directly, affects the people in the City of Racine. The efforts of individual citizen and citizen groups to combat the growing problems of water pollution has the City of Racine's support, for this public awareness is most welcome and much needed. Public concern, however, is not enough to overcome pollution problems. It must be followed by action programs in both public and private sectors. The City of Racine has been active in proceeding with pollution abatement programs that follow in the lines of criteria that have been established by the state and federal governments. We shall, in the future, enter into pollution abatement programs that will comply with the latest environmental standards that will be adopted by the state and federal governments. To date our concern and dedication to environmental protection is shown by the following:

I. Wastewater Treatment

A. Plant

As per the attached orders from the State of Wisconsin, Department of Natural Resources, the City of Racine, Wisconsin is to place in operation by December 31, 1972, facilities to adequately treat all waters tributary to the sanitary sewer system. Such treatment shall provide for a minimum of 85 per cent removal of the total phosphorus tributary to the wastewater treatment plant.

In complying with the above order, the City of Racine has taken the following steps:

1. On March 16, 1970, the City of Racine signed a contract with a consulting engineering firm to prepare a report on the expansion of the city's wastewater treatment plant.

2. On November 17, 1970, the Common Council of the City of Racine approved said report and directed the consulting engineers to begin the preparation of the plans and specifications for the expansion of the wastewater treatment plant. (See attached Resolution)

3. The proposed enlarged wastewater treatment plant for the City of Racine is expected to remove in excess of 90 per cent of the suspended solids and 5-day biochemical oxygen demand and 85 per cent of the phosphorus present in the raw wastewater. The estimated construction cost is $6,400,000.00.

4. It is anticipated that construction will begin in the fall of 1971 with a completion date of December, 1972.

B. Industrial Waste:

As per Federal regulations in regard to Industrial Waste, the City of Racine has taken the following steps:

1. On May 6, 1969, the Common Council of the City of Racine adopted a Wastewater Control Ordinance which establishes what type of discharges can or cannot be directed to the wastewater treatment plant. This ordinance was adopted to prevent any detrimental waste from entering the plant and thus assuring the proper and efficient operation of the wastewater treatment plant.

   A copy of this ordinance is attached to this report.

2. The latest Federal Regulations also state that where industrial wastes are to be treated by a proposed project, an equitable system of cost recovery shall be in force. During the past year, the City of Racine has established a committee for the prupose of establishing a sewer service charge. It is anticipated that a sewer service charge will go into effect on January 1, 1972.

II. Sewer Separation

1. Prior to 1935 the City, like most other cities in Wisconsin, relied on a combined sewer system to carry its sanitary sewage and storm water to the Waste Water Treatment Plant or Lake.

2. As a result of a sewer separation construction program begun in 1935 only 17% of the City is not served by separate sewer systems at the present time. With the completion of the 1969 H.U.D. Program involving the construction of 1.5 million dollars worth of sanitary and storm sewers, all but 13% of the area in the City will be served by separate sewer systems.

3. At present a Federally subsidized FWQA Demonstration Program is underway. This 1.395 Million dollar project will determine the feasibility of serving the remaining 13% of the area by the use of screening and air flotation treatment of combined sewer overflows.

4. During the time period when combined sewers were used in the City, it was required that roof downspouts be connected to the sewer. As the combined areas are separated, the individual property owners are required to disconnect their downspouts and direct the water onto the surface and thus into the storm sewer system.

5. The City of Racine will meet the requirements of the Department of Natural Resources order dated April 17, 1970, requiring separation by July 19, 1977, This will be accomplished by separation or by installation of combined overflow treatment units, provided that State and Federal Grants are continued at the present level of funding.

Department of Natural Resources
Box 450
Madison, Wisconsin 53701

February 27, 1970

ROOT RIVER DRAINAGE AREA

CITY OF RACINE
RECEIVED
MAR 12 1970
CITY CLERK DEPT'S. & PERSONNEL

In accordance with the requirements of the June 11, 1968 order, you were required to submit a preliminary report and schedule for the construction of adequate facilities in keeping with the State Water Quality Standards and the recommendations of the Lake Michigan Enforcement Conference. Since that date, the conference has reconvened and clarified its recommendations.

As a result of the conference, the Department has agreed to amend the requirements as follows:

1. All effluent discharges to the surface waters of the Lake Michigan Basin must have secondary bio-mechanical treatment or equivalent by December, 1972.

2. All municipalities or industries with a population equivalent of more than 2,500 persons (8,750 pounds of total phosphorus per year) shall remove 85 percent of the total phosphorus on an annual basis.

3. Year-round disinfection of all effluents containing pathogens or their indicator organisms must be provided.

4. A program for separation or control of pollution from combined sewers and those receiving excessive amounts of clear water must be developed and completion of the project control facilities must be attained by July, 1977.

While the Department does not order phosphorus removal for communities under 2,500 population, it does not discourage them from doing so. This guideline does not preclude the Department from ordering phosphorus removal where such discharges are causing or may cause over-fertilization of surface waters.

The attached order properly reflects the modified requirements of the conference as well as the implementation schedule applicable to your specific case.

Very truly yours,
Division of Environmental Protection

Thomas G. Frangos

Thomas G. Frangos
Administrator

Attach.

Department of Natural Resources
Box 450
Madison, Wisconsin 53701

4B-68-4-21A

Racine, City of

Findings of Fact

THE DEPARTMENT FINDS:

1. That the City of Racine was issued an order on June 11, 1968 which required submission of a report and schedule for the separation of remaining combined sewers and exclusion of clear water from sanitary sewers, and for the construction of improvements to the treatment facilities including 80 percent removal of the total phosphorus content of the effluent.

2. That the City has submitted a schedule for sewer separation, plant improvements and phosphorus removal.

Conclusions of Law

1. That this Department, having reviewed the matter, has authority under 144.025 (2) (d), Wisconsin Statutes, to issue an amended order directing particular owners to secure such operating results toward the control of pollution of the waters of the state as the Department prescribes, within a specified time.

2. That the order hereinafter made for separation of combined sewers, exclusion of clear water from the sanitary sewers, and construction of improvements to the treatment facilities by the City of Racine is reasonable, proper and necessary for the protection of public rights in Lake Michigan.

Order

IT IS, THEREFORE, ORDERED

1. That the City of Racine complete its combined sewer separation program by December 1, 1972.

2. That the City of Racine place in operation by December 31, 1972 facilities to adequately treat all wastes and waters tributary to the sanitary sewer system. Such treatment shall provide a minimum of 85 percent annual average removal of the total phosphorus tributary to the sewage treatment plant.

3. That the City of Racine submit annual reports to the Department beginning November 1, 1970 demonstrating progress towards compliance with provisions 1 and 2 of this order.

Dated at Madison, Wisconsin, this 27th day of February, 1970.

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES
For the Secretary

By ______
Thomas G. Frangos, Administrator
Division of Environmental Protection

File

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

L. P. Voigt
Secretary

BOX 450
MADISON, WISCONSIN 53701

April 17, 1970

Mr. George W. Benson
City Clerk
Racine, Wisconsin 53403

CITY OF RACINE
RECEIVED
APR 20 1970
CITY CLERK & PERSONNEL
DEPT'S.

Reproduced from best available copy.

Dear Mr. Benson:

Enclosed is a copy of Order No. 4B-68-4-21AA which has been amended to correct a typographical error in the compliance date for completion of Racine's combined sewer separation program. The incorrect compliance date of December 1, 1972 has been changed to July, 1977 to meet the requirements of the Lake Michigan Enforcement Conference recommendations.

Very truly yours,
Division of Environmental Protection

Thomas G. Frangos
Administrator

Department of Natural Resources
Box 450
Madison, Wisconsin 53701

4B-68-4-21AA

Racine, City of

Findings of Fact

THE DEPARTMENT FINDS:

1. That the City of Racine was issued an order on June 11, 1968 which required submission of a report and schedule for the separation of remaining combined sewers and exclusion of clear water from sanitary sewers, and for the construction of improvements to the treatment facilities including 80 percent removal of the total phosphorus content of the effluent.

2. That the City has submitted a schedule for sewer separation, plant improvements and phosphorus removal.

Conclusions of Law

1. That this Department, having reviewed the matter, has authority under 144.025 (2)(d), Wisconsin Statutes, to issue an amended order directing particular owners to secure such operating results toward the control of pollution of the waters of the state as the Department prescribes, within a specified time.

2. That the order hereinafter made for separation of combined sewers, exclusion of clear water from the sanitary sewers, and construction of improvements to the treatment facilities by the City of Racine is reasonable, proper and necessary for the protection of public rights in Lake Michigan.

Order

IT IS, THEREFORE, ORDERED:

1. That the City of Racine complete its combined sewer separation program by July, 1977.

2. That the City of Racine place in operation by December 31, 1972 facilities to adequately treat all wastes and waters tributary to the sanitary sewer system. Such treatment shall provide a minimum of 85 percent annual average removal of the total phosphorus tributary to the sewage treatment plant.

3. That the City of Racine submit annual reports to the Department beginning November 1, 1970 demonstrating progress towards compliance with provisions 1 and 2 of this order.

Dated at Madison, Wisconsin, this 17th day of April, 1970.

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES
For the Secretary

By

Thomas G. Frangos, Administrator
Division of Environmental Protection

RESOLUTION NO. 305

RESOLVED, that the engineering report submitted by Consoer, Townsend and Associates on Waste Water Treatment Facilities be approved and said report be submitted to the Southeastern Wisconsin Regional Planning Commission and the State of Wisconsin for approval for State and Federal Aid.

FURTHER RESOLVED, that Consoer, Townsend and Associates are hereby authorized and instructed to proceed with the preparation of plans and specifications for the additional Waste Water Treatment Facilities recommended in the aforementioned report.

STATE OF WISCONSIN)
)ss
COUNTY OF RACINE)

I, Albert A. Reid, City Clerk for the City of Racine, Racine County, Wisconsin, DO HEREBY CERTIFY that the foregoing is a true and correct copy of a resolution which was adopted by the Common Council of the City of Racine under Item 39 of the meeting held November 17, 1970.

Dated this 2nd day of December, 1970.

WASTEWATER CONTROL ORDINANCE

and

OPERATING STANDARDS FOR WASTEWATER DISCHARGES INTO PUBLIC SEWERS, NATURAL OUTLETS or WATERCOURSES

of the

City of Racine, Wisconsin
Water Pollution Control Division

Gary K. Coates, P. E.
Engineer-Manager
2101 S. Main Street
Racine, Wisconsin 53403
414 - 633-7709

ORDINANCE NO. 11-69

To create Chapter 12 of the Municipal Code of the City of Racine relating to the Control of Sewage and Wastewater Discharged into the Wastewater System of the City of Racine.

The Common Council of the City of Racine do ordain as follows:

Part 1.

Chapter 12 of the Municipal Code of the City of Racine is hereby created to read as follows:

"CHAPTER 12"

WASTEWATER CONTROL

12.01 Scope. The Wastewater System of the City of Racine includes all of the sanitary sewers and the Wastewater Treatment Plant and appurtenances operated for the treatment and disposal of sewage and wastewater within the entire area served thereby.

12.02 Purpose. It is hereby determined and declared to be necessary and conducive for the protection of the health, safety and welfare of the public, to prevent abuse or break down of the wastewater control system, to obtain the maximum practical reduction of wastes entering the system, and to protect the receiving waters from pollution and to regulate the use of all sewers and drains connected to the sanitary sewer system and the wastewater treatment plant of the City of Racine.

12.03 Policy as to Industrial Waste. It is hereby declared to be the policy of the City of Racine that industrial wastes shall be accepted into the sanitary sewers and Wastewater Treatment Plant of the City of Racine under the following conditions:

(a) Treatment by the City is at less cost than by the industry.

(b) The wastes are amenable to treatment by the City either directly or with pretreatment.

(c) Controls are provided so there is no damage to sewers or treatment plant and wastes can be measured.

(d) The industry pay for the additional actual cost of treatment.

ORDINANCE NO. 11-69

12.04 Definitions. The following definitions shall apply in the interpretation and enforcement of this ordinance.

(a) "Biochemical Oxygen Demand" shall mean the quantity of oxygen utilized in the biochemical oxidation of organic matter under standard laboratory procedure in five (5) days at 20 degrees Centigrade expressed in milligrams per liter.

(b) "Combined Sewer" shall mean a sewer which receives storm water, surface runoff, industrial cooling water and sewage.

(c) "Domestic Sewage" shall mean sewage discharging from the sanitary conveniences of dwellings (including apartment houses and hotels), office buildings, factories, commercial establishments, institutions, and free from storm surface water, cooling water and industrial wastes.

(d) "Garbage" shall mean solid wastes from the domestic and commercial preparation, cooking, and dispensing of food, and from the handling, storage, and sale of produce.

(e) "Industrial Wastes" shall mean any liquid substance rejected or escaping from any industrial, manufacturing, trade or business process as distinct from domestic sewage.

(f) "Natural Outlet" shall mean any outlet into watercourse, pond, ditch, lake or other body of surface or ground water.

(g) "Person" shall mean any individual, firm, company, association, society, corporation, or group.

(h) "pH" shall mean the logarithm of the reciprocal of the hydrogen concentration.

(i) "Properly Shredded Garbage" shall mean garbage which has been shredded to such a degree that all particles will be carried freely under the flow conditions normally prevailing in public sewers with no particle greater than one-half inch in any dimension.

(j) "Public Sewers" shall mean a sewer in which all owners of abutting properties have equal rights and is controlled by the City.

(k) "Receiving Waters" shall mean any public water into which effluent from any wastewater treatment plant or any public or private sewer is discharged.

ORDINANCE NO. 11-69
(cont'd)

(l) "Sanitary Sewers" shall mean a sewer which carries domestic sewage and industrial wastes, and to which storm, surface, ground and unpolluted cooling or process waters are not intentionally admitted.

(m) "Sewage and Wastewater" shall mean any combination of water-carried wastes from residences, buildings, industrial establishments, institutions, manufacturing plants, processing plants, commercial establishments, or other places in which such wastes are produced, together with such ground, surface, storm or other water as may be present.

(n) "Sewer" shall mean a pipe or conduit for carring sewage.

(o) "Shall" is mandatory; "May" is permissive.

(p) "Storm Sewer or Storm Drain" shall mean a sewer which carries storm water, surface water, drainage and unpolluted industrial water discharges, such as cooling and air conditioning water, but excludes sewage.

(q) "Suspended Solids" shall mean the dry weight of solids which are physically suspended or floating in a flow of sewage, industrial waste, or water which are measureable by laboratory filtering.

(r) "Wastewater Treatment Plant" shall mean any devices and/or structures used for the treating of sewage.

(s) "Wastewater Works" shall mean all facilities for collecting, pumping, transporting, treating and drying of sewage.

(t) "Watercourse" shall mean a channel in which a flow of water occurs, either continuously or intermittently.

(u) "Engineer-Manager" shall mean the authorized department head of the Water Pollution Control Division of the City of Racine, having supervision of maintenance and operation of the sewerage system and wastewater treatment facilities of the City, or his authorized deputy, agent or representative.

12.05 Unpolluted Waters Prohibited.

(a) No person shall discharge or cause to be discharged, any storm water, surface water, ground water, roof runoff, subsurface drainage which is not contaminated, unpolluted cooling water or unpolluted industrial process waters to any sanitary sewer, provided that a storm drain into which such waters and drainage can be discharged is available at reasonable cost, and provided further that separation of existing internal combined sewers in any source of industrial waste shall not be required, except in the case of system replacement or renewal initiated by the owner of such source.

(b) Storm water and all uncontaminated drainage shall be discharged to such sewers as are specifically designated as storm sewers, combined sewers, or to a natural outlet or watercourse approved by the Engineer-Manager. Industrial cooling water or unpolluted process waters may be discharged, upon approval of the Engineer-Manager, to a storm sewer, combined sewer, natural outlet, or watercourse.

12.06 Prohibited Waste Discharges. No person shall discharge or cause to be discharged any of the following described waters or wastes to any public sewers, natural outlet or watercourse:

(a) Any explosive or flammable solid, liquid or gas, including but not limited to gasoline, kerosene, benzene, naphtha, fuel oil.

(b) Any waters or wastes causing a pH lower than 5.0 or higher than 10.0 at any point in the public sewer or receiving water.

(c) Any solid or viscous substances in quantities or of such size capable or causing obstruction to the flow in sewers, or other interferences with the proper operation of the wastewater works, including, but not limited to, ashes, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, wood, underground garbage, lime slurries, chemical residue, paint residues, etc.

(d) Any waters or wastes containing toxic solids, liquids, or gases in sufficient quantity acting either singly or by interaction with other wastes to injure or interfere with any wastewater treatment process, constitute a hazard to humans, animals, or aquatic life, or create a public nuisance.

(e) Any solid, liquid or gas creating a hazard or public nuisance in the receiving water.

12.07 Conditionally Prohibited Discharges.

(a) No person shall discharge or cause to be discharged into the sanitary sewers any wastewaters having physical properties and concentrations of chemical constituents or such other physical and chemical properties which exceed the standards and limitations established by the Board of Standards under Section 12.09 hereof and adopted by the Common Council.

ORDINANCE NO. 11-69
(cont'd)

(b) Should any sewage have the characteristics set out in (a) above, the City may, nevertheless, accept such sewage subject to individual agreements which specify pretreatment or controls on rates and quantities of discharges which, in the opinion of the Engineer-Manager will protect the wastewater works and wastewater treatment process, or The City may agree to accept such sewage subject to the payment of charges for the actual additional costs to the City resulting from the treatment of such sewage by the City. In making such agreements the Engineer-Manager shall give consideration to such factors as the quantities of such wastes in relation to the capacity, flow and velocities in the receiving sewers, degree of treatability of the sewage and requirements of the public authorities having jurisdiction over discharges from the City wastewater works. If the Engineer-Manager permits the pretreatment or equalization of sewage flows, the design and installation of the plants and equipment for such pretreatment or equalization shall be subject to review and approval of the Engineer-Manager, and subject to the requirements of all applicable ordinances, laws and regulations.

(c) Where preliminary treatment or flow-equalizing facilities are provided for any sewage, they shall be maintained continuously in satisfactory and effective operation by the owner at his expense.

(d) When required by the Engineer-Manager, the owner of any property serviced by the building sewer carrying industrial wastes into a public sanitary or public combined sewer shall install a suitable control manhole together with such necessary meters and other appurtenances in the building sewer to facilitate observation, sampling and measurements of the wastes. Such manhole, when required, shall be accessibly and safely located and shall be constructed in accordance with plans approved by the Engineer-Manager. The manhole shall be installed by the owner at his expense, and shall be maintained by him so as to be safe and accessible at all times.

(e) All measurements, tests, and analyses of sewage to which reference is made in this ordinance shall be in accordance with the latest edition of "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association. Measurements shall be made and samples taken at the control manhole provided. In the event that no special manhole has been required, the control manhole shall be considered to be the nearest downstream manhole in the public sewer to the point at which the building sewer is connected. Sampling shall be carried out by customarily accepted methods to reflect the effect of constituents upon the wastewater works and to determine the existence of hazards to the health, safety and welfare of the public. On the basis of analysis of the data, the Engineer-Manager will determine whether grab or composite sampling is required.

ORDINANCE NO. 11-69
(cont'd)

(f) The Board of Standards shall hear and decide all appeals by persons affected by any decision of the Engineer-Manager to accept or reject sewage under the provisions of Section 12.07 of this ordinance and shall, in the appropriate cases authorize the acceptance of sewage under conditions and safeguards in harmony with the general policy expressed in Section 12.03.

12.08 Authority to Inspect.

(a) The Engineer-Manager, members of the Board of Standards and other duly authorized employees of the City bearing proper credentials and identification shall be permitted to enter upon all properties connected to the wastewater works for the purpose of inspection and observation of the measurement, sampling, and testing, in accordance with the provisions of this ordinance, and to inspect the discharge to the sewers or natural outlets or wastewater treatment facilities. Only the Engineer-Manager shall be permitted to enter any premises for the purpose of reviewing plant operations with designated plant personnel for the purpose of determining the scope of the waste control program, and any information so obtained by him shall be confidential, provided that any review of trade secrets or proprietary processes shall be limited to any discharge therefrom which flows into a public sewer.

(b) While performing the necessary work on any private property referred to in Section (a) above, all persons so engaged shall observe all safety rules applicable to the premises, and the tenant and owner of such premises shall be held harmless for injury or death to such City representatives and the City shall indemnify such tenant and owner against loss or damage to their property by such City representatives and against liabilities, claims and demands for personal injury or property damage asserted against such tenant and owner and growing out of the work being done by such City representatives, except as such as may be caused by the negligence or failure of such tenant and/or owner to maintain safe conditions as required by this ordinanace.

12.09 Board of Standards.

(a) Creation. There is hereby created a Board of Five (5) voting members of which one shall be an Alderman, one shall be the Engineer-Manager and three shall be members with experience in the field of industrial wastewater management.

(b) Appointment and Terms. The members of the Board shall be appointed by the Mayor subject to the confirmation of the Council. Vacancies shall be filled in the same manner.

At the first regular meeting of the Council following the effective date of this ordinance the Mayor shall, subject to the confirmation of the Council, appoint the Alderman member of

ORDINANCE NO. 11-69
(cont'd)

the initial Board for a term expiring on the 1st Tuesday in May, 1970; one at-large member for a term expiring on the 1st Tuesday in May, 1970; one at-large member for a term expiring on the 1st Tuesday in May, 1971; and one at-large member for a term expiring on the 1st Tuesday in May, 1972. All subsequent appointments of at-large members shall be made on the 1st Tuesday in May and shall be for a term of three (3) years. The term of the Alderman member shall be one (1) year; he shall be appointed on the 1st Tuesday in May; and he shall be a member of the Board only as long as he continues to hold his office as Alderman. The Engineer-Manager shall be a member of the Board so long as he continues to hold his position as Engineer-Manager. Board members shall receive no compensation for their services. Every person appointed as a member of the Board shall take and file an official oath.

The Alderman member of the initial Board shall serve as temporary Chairman.

The terms of the at-large members shall begin on appointment, confirmation and qualification and shall continue until the qualification of a successor.

(c) Officers. Within thirty (30) days after the appointment of the initial members and each year thereafter within thirty (30) days after the time designated for the beginning of terms, the members of the Board shall organize by the election, from among their number, of a Chairman and a Secretary and such other officers as they may deem necessary.

(d) Procedure.

(1) General. The Board of Standards shall adopt rules and regulations for its own government, not inconsistent with law or the ordinances of the City of Racine.

(2) Quorum. Three members of the Board shall constitute a quorum on all matters requiring a decision by the Board. The concurring vote of a majority of the Board shall be necessary to reverse any order, requirement, decision or determination of the Engineer-Manager, or to decide in favor of the applicant on any matter upon which it is required to pass, or to establish any standards or limits which it is required to establish under this ordinance.

(3) Meetings. Meetings of the Board of Standards shall be held at the call of the Chairman and at such other times as the Board may determine. Hearings of the Board shall be public. The Board may call on any city official or any city department for assistance in the performance of its duties and it shall be the duty of such officials and departments to render such assistance to the Board as may be reasonably required.

ORDINANCE NO. 11-69
(cont'd)

(e) Powers and Duties. The Board shall have the following powers and duties:

(1) To adopt guidelines on physical and chemical properties and characteristics of wastewaters under Sections 12.06 and 12.07 in relation to the policies stated in Sections 12.02 and 12.03 of this ordinance.

(2) To establish standards and limits for the concentration of chemical constituents and for such other physical and chemical properties as may be required for wastewaters discharged into public sewers or accepted at the wastewater treatment plant. In setting such limits the Board shall take into consideration the purpose and declared policy of this ordinance as well as the requirements of public authority having jurisdiction over quality of discharges from city wastewater works.

(3) Approval by Council. The guidelines established by the Board under paragraph 1 and the standards and limits established under paragraph 2 above shall not become effective until they have been submitted to the Common Council of the City of Racine and approved by it. Such guidelines, standards and limits shall, upon approval of the Common Council, be filed in the Office of the City Clerk of the City of Racine and shall become effective upon such filing.

(4) Appeals. To hear and decide appeals where it is alleged there is error in any order, requirement, decision or determination by the Engineer-Manager in the administration of this ordinance, the Engineer-Manager shall be disqualified from sitting as a member of the Board in any appeal under this paragraph.

(5) Decision of Board. In exercising its powers under this ordinance the Board may, in conformity with the provisions of this ordinance, reverse or affirm, wholly or partly or may modify the order, requirements, decision or determination appealed from, and make such order, requirement, decision or determination as ought to be made, and to that end shall have all of the powers of the Engineer-Manager.

12.10 Penalties.

(a) Notice. Any person found to be violating any provision of this Ordinance shall be served by the City with written notice stating the nature of the violation and providing a reasonable time limit for the satisfactory correction thereof.

(b) Any person who shall continue any violation beyond the limit provided for in paragraph (a) shall be subject to the penalties provided by Section 1.07 of the Municipal Code of the City of Racine.

(c) Damages. In addition to any penalty provided herein, any person violating the provisions of this Ordinance shall become liable to the City for any expense, loss or damage sustained by the City by reason of such violation.

ORDINANCE NO. 11-69
(cont'd)

Part 2.

This Ordinance shall take effect upon passage and publication.

Passed by the Common Council May 6, 1969

Approved May 8, 1969

Kenneth L. Huck
Mayor

Attest:

George H. Benson
City Clerk

OPERATING STANDARDS
FOR
WASTEWATER DISCHARGES INTO
PUBLIC SEWERS, NATURAL OUTLETS
OR WATERCOURSES
ADOPTED BY BOARD OF STANDARDS

SECTION I. Authority.

The Board of Standards created by Chapter 12 of the Municipal Code of the City of Racine, in accordance with the authority granted by Section 12.09 (e) of that Code, hereby establishes the following guidelines and standards for controlling the characteristics of wastewater which discharges into the public sewers, natural outlets or watercourses of the City of Racine.

SECTION II. Intent.

In order to obtain and insure the continued satisfactory operation of the Wastewater Treatment Plant at its optimum efficiency consistent with the purpose and policy of Chapter 12 of said Code, it is necessary to insure that strong materials not be admitted to the system in sufficient or slug quantities that would reduce or eliminate the effective operation of the system. Strong materials are those which cause the waste to be prohibited by Section 12.06 of the Code, or which exceed the guidelines, standards or limitations contained herein or those which in sufficient quantity or in combinations will, in the opinion of the Engineer-Manager cause this reduced effectiveness.

SECTION III. Prohibited Waste Discharges.

As prescribed by Section 12.06 of the Municipal Code, no person shall discharge or cause to be discharged any of the following described waters or wastes to any public sewers, natural outlet or watercourse:

(a) Any explosive or flammable solid, liquid, or gas, including but not limited to gasoline, kerosene, benzene, naphtha, fuel oil.

(b) Any waters or wastes causing a pH lower than 5.0 or higher than 10.0 at any point in the public sewer or receiving water.

(c) Any solid or viscous substances in quantities or of such size capable of causing obstruction to the flow in sewers, or other interferences with the proper operation of the wastewater works, including, but not limited to, ashes, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers,

OPERATING STANDARDS
(cont'd)

tar, plastics wood, unground garbage, lime slurries, chemical residue, paint residues, etc.

(d) Any waters or wastes containing toxic solids, liquids, or gases in sufficient quantity acting either singly or by interaction with other wastes to injure or interfere with any wastewater treatment process, constitute a hazard to humans, animals, or aquatic life, or create a public nuisance.

(e) Any solid, liquid or gas creating a hazard or public nuisance in the receiving water.

SECTION IV. Guidelines.

The following are guidelines to be used by the Engineer-Manager and the Board of Standards to determine discharges that are unacceptable.

A. Any solid, liquid or vapor causing a temperature higher than 150° F or lower than 32° F at the first downstream manhole after the point of discharge.

B. Any water or wastes containing substances which may solidify or become viscous and cause obstruction to the flow in sewers at temperatures between 32° F and 150° F.

C. Any water or wastes containing fats, grease, oils or waxes, whether emulsified or not, in excess of 100 mg/l.

D. Any waters or wastes containing cadmium, chromium, copper, lead, nickel, zinc, and other heavy metal toxic substances totalling more than 15 mg/l.

E. Any wastes exerting excessive or unusual chlorine demand, oxygen demand, biochemical oxygen demand or chemical oxygen demand in such quantities as to constitute a significant load on the Wastewater Treatment Plant or receiving waters.

F. Any radioactive wastes or isotopes of such half-life or concentration as may exceed limits established by State or Federal Regulations.

G. Any water or wastes containing excessive amounts of phosphorous so as to constitute a significant load at Wastewater Treatment Plant or receiving waters.

H. Any waters or wastes containing phenols, chlorinated hydrocarbons, mercaptans, or other taste or odor producing substances to such degree that such material received in the composite sewage at the Wastewater Treatment Plant exceeds a concentration such that the plant effluent will impart

OPERATING STANDARDS
(cont'd)

unpalatable flavor to food fish, or result in noticeable offensive odors in the vicinity of the plant or receiving water, or otherwise interfere with the legitimate use of the water.

I. Any water or wastes containing excessive color or color agents which cannot be removed to allowable levels in the Wastewater Treatment Process.

J. Any water or wastes containing unusual concentrations of suspended solids and/or dissolved solids.

K. Any waters or wastes containing substances, whether they be solids, liquids, or gases which are not amenable to treatment or reduction by the Wastewater Treatment Process employed, or are amenable to treatment only to such degree that the Wastewater Treatment Plant effluent cannot meet the requirements of State and Federal agencies having jurisdiction over discharge to the receiving waters, or create a public nuisance.

The Engineer-Manager with the approval of the Board of Standards may in specific cases enforce stricter limitations than are shown in the guidelines if the needs or capacity of the system requires these limitations, or the Engineer-Manager may accept sewage with characteristics that exceed the guidelines subject to written agreements under the conditions described in Section 12.07 (b) of the Code.

The Board of Standards shall from time to time recommend to the Common Council such changes in the guidelines as are necessary to best indicate the current level of each restriction the Board finds necessary to enforce in the majority of cases, in order to obtain satisfactory operation of the system.

SECTION V. Information Required.

The Engineer-Manager may require any person, firm, organization or corporation manufacturing, using or storing strong materials as described above to submit to the Board of Standards on 90 days notice, such information as the Board deems necessary for a determination of the adequacy of the physical facilities provided for the control and/or measurement of Wastewater discharges to the sewage system of the City of Racine.

SECTION VI. Controls.

The Engineer-Manager may require any person, firm, organization or corporation manufacturing, using or storing strong chemical solutions or compounds to have each and every room or area where said compounds or solutions are used or stored, so constructed that none of said strong solutions or compounds can escape therefrom by means of building sewer drain or otherwise directly or indirectly to the public sanitary sewer system of the City or into any receiving waters.

OPERATING STANDARDS
(cont'd)

SECTION VII. Changes or Additions.

It shall be necessary to obtain approval of the Engineer-Manager prior to making changes or additions to facilities which would materially affect the acceptability of wastes into the Wastewater System.

SECTION VIII. Inspection.

The Engineer-Manager may inspect all control facilities periodically and report to the Board of Standards on the maintenance of such controls.

SECTION IX. Accidental Discharge.

If in spite of the above, an accidental discharge of strong materials occurs, the person, firm, organization or corporation having the accident shall inform the Racine City Wastewater Treatment Plant Engineer-Manager or operator immediately by telephone of such accidental discharge and all pertinent facts available at the time in order to enable the Engineer-Manager to take corrective action where possible.

SECTION X. Testing Procedures.

In forming an opinion on the acceptability of solutions or compounds into the sewage system and in analyzing the operations of the plant or system the Engineer-Manager and Board of Standards will be permitted to use the American Society for Testing Materials, Latest Edition and other recognized testing procedures in addition to the "Standard Methods" as spelled out in the Ordinance.

Adopted by the Common Council June 16, 1970

Item 35 (2)

city of RACINE...racine, wisconsin
OFFICE OF THE CITY ATTORNEY — Jack Harvey

March 23, 1971

City of Racine Statement to the Lake Michigan Enforcement Conference
March 23 & 24, 1971. Sherman House, Chicago, Illinois

In an earlier statement Dr. G. P. Ferrazzano presented to this Commission the statement of one community along the shores of Lake Michigan that is carrying out - according to plans initiated within this Commission - an effective pollution abatement program.

While this program is expensive, it is the City of Racine's belief that it is effective and consistent with the objectives and timetables established within the framework of this Commission.

There is no question that there are an unknown number of communities along the shores of Lake Michigan that have been "hedging" on taking steps necessary to save Lake Michigan. But these communities are not confined to the State of Wisconsin.

Recently Attorney General William J. Scott of Illinois singled out a half dozen municipalities of Wisconsin and now seeks to bring them into the U.S. Supreme Court to abate alleged pollution practices. This is not the time or place to argue the merits of that litigation - nor is this the time and place to ask the question: "Look, who's calling the kettle black."

The point to be made is that action of this type is working at cross purposes of this Conference. It would appear that the appropriate approach at overcoming the overall problem is for the four States to work together within the framework of the Conference. It would appear that the time has come for this Conference to become hard-nosed and to take a more firm position against those States, municipalities and individuals and firms who have been reluctant to proceed with programs needed to overcome the pollution problem.

Certainly, if the Commission doesn't take measures to pursue the objectives of this Commission, our meeting here is a waste of time and money.

The City of Racine, therefore, urges upon this Commission that it immediately embark upon a program of stricter enforcement of its agreed upon program.

Edward A. Krenzke
Deputy City Attorney

EAK:lj

MR. STEIN: If nothing more, may we go on to the Pesticide Committee Report? We are still lucky enough to have Dr. Mount.

STATEMENT OF DONALD I. MOUNT, Ph.D.,
CHAIRMAN, LAKE MICHIGAN INTERSTATE
PESTICIDE COMMITTEE, NATIONAL WATER QUALITY
LABORATORY, ENVIRONMENTAL PROTECTION AGENCY,
DULUTH, MINNESOTA

DR. MOUNT: I would like to start out, Mr. Chairman, by saying that parts of this report from the States and from the other agencies didn't reach me until Monday of this week and while the various participating members did see partial drafts of this report, none of them have seen the entire report, and so where subjective interpretation or summaries are involved, I will take responsibility for their errors if there are any.

A program for monitoring pesticide levels in streams tributary to the Upper Great Lakes was funded in October 1969 by the FWQA on a two-for-one matching basis with approximately $40,000 of Federal funds granted to Illinois, Indiana, Michigan, Minnesota, and Wisconsin. The principal project objectives are: 1) to identify the levels of pesticides in tributary streams to the Great Lakes; 2) to identify the sources so they may be controlled; and 3) to establish backgrounds against which to judge the success of control programs. This funding has allowed the States in the Lake Michigan Interstate Pesticide Committee -- Illinois, Indiana, Michigan, and Wisconsin -- to staff and equip laboratories to determine existing pesticide levels in major and minor tributaries and water intakes of Lake Michigan.

Michigan

Upon receipt of the FWQA grant, Michigan initiated a statewide pesticide monitoring program. Activities of the first year of the program included the establishment of personnel and adequate laboratory facilities, the collection and analysis of composite water samples from 29 major tributaries, the use of freshwater clams to monitor pesticide levels in 54 tributaries, and the analysis of water from 47 Great Lakes municipal water intakes. (Clams were used to reduce the work involved in sampling smaller tributaries.)

Clams proved to be good indicators of pesticides contained in streams. Streams draining the Thumb Area to Lake Huron, tributaries to lower Lake Michigan, and streams in the Grand Traverse Bay area showed the highest concentrations of DDT in clam tissues. In streams from which both clams and water were analyzed, the average concentration factor by the clams was approximately 500 times.

Wisconsin

The State of Wisconsin analyzed resident invertebrate organisms and clams at selected sites near the mouth of rivers tributary to both Lake Michigan and Lake Superior to determine pesticide levels present. Nearly 50 percent of all invertebrate analysis fell below 10 parts per billion which for this study is considered background level. Sites where concentrations exceeded 10 p.p.b. but were less than 100 p.p.b. may be significantly contaminated and further investigations are recommended. Where concentrations in invertebrates exceeded 100 p.p.b., intensive efforts are required to locate and eliminate the sources of pesticides. Counties with four or more analyses over 100 p.p.b. included Door, Kenosha, Milwaukee, Ozaukee, and Racine. The contamination in Door County may be due to runoff from the numerous orchards. Kenosha, Milwaukee, Ozaukee, and Racine Counties are relatively populous and industrialized. Counties in the Lake Superior drainage basin with low pesticide concentrations are sparsely populated with little agriculture or industry.

Over 80 percent of all samples had dieldrin concentrations less than 10 p.p.b. Many samples were less than 2 p.p.b. Counties with four or more analyses greater than 10 p.p.b. were Kenosha, Milwaukee, Ozaukee, and Racine. Sites with concentrations between 2 and 10 p.p.b. should be investigated further. Where concentrations exceed 10 p.p.b., comprehensive studies are necessary to locate dieldrin sources.

Kenosha, Milwaukee, Ozaukee, and Racine Counties again had the highest concentrations of DDT and dieldrin in fish. The fish analyzed from Shawano County also had high DDT concentrations. Most high concentrations were found in the southeastern counties of Wisconsin.

In several instances, pesticide or apparent pesticide contamination has been traced to point sources where necessary corrective action has been taken. In far more situations, additional sampling is necessary to locate and eliminate point sources of pesticide contamination. Areas with an indication on one column analysis of high concentrations of chlorinated hydrocarbons other than the DDT complex and dieldrin also need further investigation. The probability of analytically interfering compounds in these areas is significant.

Illinois

The State of Illinois has not yet acquired the necessary facilities and personnel to perform pesticide analyses in their own laboratory but has collected samples of Lake Michigan water, sewage plant effluents to Lake Michigan, and flow-in tributaries to Lake Michigan. They then sent these samples to the Anderson Laboratories, Inc., Urbana, Illinois, for analysis. Sampling was conducted in the fall of 1970 and analyses were made for dieldrin, heptachlor epoxide, and DDT. Future sampling will be done to identify lindane, aldrin, endrin, and methoxychlor.

Water samples were collected at two tributary streams, seven sewage treatment plants, six water treatment plants, and three open lake stations.

Indiana

Indiana has sampled water, sediments, clams and invertebrates beginning in June 1970. No major sources of pesticide were found. Low water conditions produced the highest concentrations of DDT. Based on usage surveys, present DDT levels appear to be from past usage. Indiana feels that the use of clams was unsuccessful and should be discontinued.

EPA Lake Michigan Basin Office

Results of analyses by the Lake Michigan Basin Office in Chicago on open lake samples indicate that dieldrin was not detectable in more than one-half of the samples. A weekly sampling of the Chicago Filtration Plant from April 1970 to August 1970 shows highly variable concentrations of DDT -- but low ones -- that are generally higher than the open lake samples but without a seasonally-related trend. The purpose of this sampling site was to identify trends in the pesticide levels in Lake Michigan and to date none are apparent.

Great Lakes Fishery Laboratory, BSFW, Ann Arbor, Michigan

During 1970, The Bureau of Sport Fisheries and Wildlife Laboratory in Ann Arbor sampled several species of fish from different parts of Lake Michigan and analyzed them for insecticide residues.

Lake trout were collected from the South Haven-Saugatuck area of Lake Michigan in May, June, and July 1970. Total DDT concentrations in nineteen of these fish, averaging from 22 to 26 inches in length, ranged from 11 to 28 p.p.m. with an average concentration of 19 p.p.m. Dieldrin concentrations ranged from 0.14 to 0.45 p.p.m. with an average of 0.27 p.p.m. Smaller lake trout have substantially lower concentrations of both DDT and dieldrin.

Thirty chubs collected off Saugatuck, Michigan, contained an average DDT concentration of 10.2 p.p.m. and dieldrin concentrations averaged 0.19 p.p.m.

Coho salmon (average length 18 inches) from the 1968 year class collected off Waukegan, Illinois, in early May contained an average DDT concentration of 2.8 p.p.m. and an average dieldrin concentration of 0.07 p.p.m. Coho collected off Ludington, Michigan, in late August (average length of 26 inches) contained DDT concentration averaging 14.1 p.p.m. and dieldrin concentrations averaging 0.12 p.p.m.

A comparison of DDT and dieldrin concentrations between fish collected in 1970 and those collected in 1969 indicates there has been no appreciable change in the concentrations of these insecticides. Fish from southern Lake Michigan have higher concentrations than those from farther north.

WARF Institute, Inc.

WARF Institute, Inc. has cooperated with the Committee and completed a survey during 1969 on the lakes. Their results generally are similar to data reported above. Their report specifically points out the interferences from chlorinated compounds formed from disinfections of sewage and of probable high PCB interference.

Problems

The analytical difficulty of measuring part per trillion levels of DDT and dieldrin in water are staggering. To put a part per trillion in more understandable terms, that concentration in Lake Michigan equals only 11,000 pounds in the entire lake. In other terms, one 10-pound coho salmon containing 20 p.p.m. would have as much as 70 acres of water, 1 foot deep and a concentration of 1 p.p.t.

To determine the accuracy of our analyses, we began a ten-laboratory comparison to check the comparability of data. The results are very disheartening because on the same sample there was as much as a 20-fold difference in the results. In comparing the analyses on 10 different water samples, there were six key laboratories reporting; three were consistently finding values about 5 times higher than the other three. Since most of the analysts did not report recovery efficiencies, there is no way to identify the erroneous results. Because these differences are so large, I have deleted all values for water data from this progress report. The best I feel we can say at present is that the DDT concentrations are less than 1 p.p.t. Only one laboratory found other hard pesticides in lake water.

Tissue analyses are much less variable. Results of an eight-lab comparison on samples of lake trout and coho salmon tissue distributed by the BSFW lab at Ann

Arbor, gave an interlab variation of only two or three times. Therefore, I have included tissue data in this report.

A critical analysis of three water samples was completed by the BSFW lab at Columbia, Missouri. Mass spectrographic confirmation was employed to confirm qualitative identification. These samples contained 50-75 p.p.t. of PCB's, 45-600 p.p.t. of di-n-butyl phthalate, and 34-300 p.p.t. of di-2-ethyl-hexyl phthalate. Any of these can seriously interfere or mask pesticide analyses. These analytical problems must be resolved before the water monitoring program can proceed. Perhaps the choice of concentrations in fish tissues as the primary measuring point is a very wise one.

PCB's

The Committee's activity to examine the PCB problem in Lake Michigan is beginning to move, but it, too, is hampered by even more severe analytical problems than for pesticides. The average laboratory cannot do definitive PCB quanitification at this time. We have developed a grant agreement with Dr. Veith at the University of Wisconsin, and last week I received assurances from EPA, WQO, Research and Development Office in Washington that this work was expected to receive funding in mid-April.

This study will identify the important isomers of PCB's found in Lake Michigan and we hope such information will lead to identification of important sources.

The States agreed to conduct an industrial waste survey to locate users of PCB's. Of the two States having most of the watershed of the lake, the State of Michigan has not completed their survey and Wisconsin's was not very informative. A prime problem is that PCB's are not used alone but rather occur in many products and users of these products are not aware that PCB's are contained in them.

The National Water Quality Laboratory and the Bureau of Sport Fisheries and Wildlife Pesticide Laboratory in Columbia, Missouri, are both conducting tests to determine the toxicity and uptake of PCB's in aquatic organisms. The PCB's with intermediate chlorine contents appear most toxic and preliminary evidence shows very large concentration factors from water into tissue. While I did not have time to poll the Committee's opinion, I believe PCB's are probably significant pollutants in Lake Michigan. The conferees may be interested to know that an action level of 5 p.p.m. for fish flesh has been selected by FDA.

Phthalates

Earlier I mentioned the occurrence of these in several water samples examined by the BSFW in Columbia. The phthalates formed have a relatively low mammalian toxicity and very scant data for fish shows moderate concentrations, approximately 1-5 p.p.m., are lethal to fish. However, evidence obtained by the Columbia lab shows teratogenic effects at lower concentrations. These chemicals are widely used in plastics and warrant watching.

Summary

1. Highest DDT concentrations occur in more populous areas.

2. No outstandingly large discharges have been found.

Perhaps I should qualify this statement now after having seen Wisconsin's tributary data in which in the previous years they did find some relatively high concentrations up as high as a tenth of a part per million of DDT, as I recall, as well as some others, and those were found in the 1968-1969 period, and I understand from Mr. Frangos that these have for the most part been corrected. Perhaps he would want to comment on that later.

3. Present sources may be from past usage.

4. No trends up or down are shown by concentrations in fish flesh.

5. Fish in southern Lake Michigan have more DDT

and dieldrin than those in the northern part.

6. Many of the chubs and larger coho and lake trout have DDT concentrations higher than 5 p.p.m., the FDA action level.

7. Larger fish are approaching the 0.3 p.p.m. action level for dieldrin.

8. Analytical problems have made all water analyses questionable.

9. PCB's are probably a significant contaminate in Lake Michigan.

10. Phthalates are occurring in the samples and determination of their importance should receive priority.

11. The Committee expects to publish a more complete progress report by June 1971.

12. A meeting is scheduled on April 13 and 14, 1971, to attempt to resolve analytical problems.

MR. STEIN: Thank you, Dr. Mount.

Are there any comments or questions?

MR. CURRIE: Yes. Dr. Mount, what are phthalates?

DR. MOUNT: I am not able to give you a chemical definition of them, but they are plasticizers which are used extensively in the plastics industry and I believe are the biggest group of plasticizers in use.

MR. CURRIE: Are they organic?

DR. MOUNT: Yes.

MR. CURRIE: What teterogenic effects are you referring to?

DR. MOUNT: These are on fish, and they cause premature hatching of eggs, abortion, deformities of the skeletal system, and this sort of thing.

MR. CURRIE: It seems to me, Mr. Chairman, this is an excellent, very informative, and important report. And once again, as with most things in this Conference, it seems unfortunate that we didn't get it in time to study it, evaluate it, understand it, and comment on it intelligently. It seems to me that is a recurring problem with these Conferences despite our repeated requests to the Administrator to see that important papers are distributed in advance.

DR. MOUNT: I might point out, Mr. Chairman, that the holdup was the four States and I got the report in only 2 weeks ago.

MR. CURRIE: Then, perhaps it should be presented at a session after we have had a chance to evaluate it. I think that the paper raises some serious problems. For one thing, it seems to be saying that we have some inedible fish in the lake, which is a rather serious problem, and I wonder what the Conference proposes to do about it?

MR. STEIN: The question I had -- and maybe this is a more general one -- perhaps, Dr. Mount, you can give us an indication of what action items you would propose that the Conference take in this area. I know that you are going to have another more complete report by June this year. Hopefully, you are going to resolve that analytical problem, which is always a very difficult one. But I am not sure, in listening to your report -- and I think this is an excellent one -- that you are proposing that the conferees take any action on any pesticide item at the present time. Is that correct?

DR. MOUNT: Well, I guess that is essentially correct.

First of all, I think that Wisconsin has taken action on sources that they have found, and I would assume that if and when Michigan is sure of theirs they will do the same certainly.

The PCB program, I think, is finally moving and I have got assurances that it will be funded. I would suggest that one of the actions that perhaps need be taken is attention directed to this phthalate section to see if it is in fact a problem.

MR. STEIN: Well --

MR. MAYO: Do you have any suggestions, Dr.

Mount, for the route that we take for directing attention to that problem?

DR. MOUNT: Well, I am very much afraid that it is going to involve essentially what the PCB's are. First of all, this terrifically difficult problem of analysis, which may not be quite so bad with the phthalates to find out what is there, and obviously then we have to follow up with where they are coming from, and connected with that there will have to be some research work to determine what levels are significant.

MR. MAYO: How quickly do you think the committee could put together a proposal for some specific action? I certainly would not hesitate to attempt to include in the work plans for Region V of EPA a significant effort, starting fiscal year 1972 if we could have a strongly stated purpose for that kind of an effort and an identification of the resources that would be required.

DR. MOUNT: Well, there are two clear things that have to come, as I say: 1) a determination of what level is significant; and then 2) a monitoring or some measurements to find out what is there; and I think that we can spell these out as good as we are going to be able to spell them out within, say, 2 months.

MR. STEIN: Yes, but I think what probably Mr.

Mayo was talking about -- and I think possibly Mr. Currie was getting at the same thing -- I know, Dr. Mount, I have been in a lot of these programs where you have been in the forefront and at first we come to these things which you say bear watching and you point with alarm as much as your scientific tentativeness can permit you that kind of luxury. But then what I think they are asking is: Is there anything on an administrative or action program which we should be doing to accelerate coming to grips with the pesticide problems in the lake?

MR. PURDY: Mr. Stein.

MR. STEIN: Yes.

MR. PURDY: It seems to me that this Conference did make a recommendation with respect to the pesticides, although I am not clear on that. But what do the conferees intend to do to respond to Mr. Currie's question with respect to DDT?

The sale of DDT has been banned in Michigan for quite sometime. From the standpoint of PCB's, Dr. Mount mentioned that we had not furnished certain information to him, and that does not mean that we do not intend to furnish it to him. We recognize the importance of this problem, and it is being assembled at the present time. In fact, quite sometime ago, we asked Commissioner Dominick to initiate research in this matter of PCB's and separately we contacted our major -- what we thought to be our major industrial users of PCB, and cautioned them against the possible long-range toxic effects of the substances and asked them to look into it. And there has been a great reduction in the use of the PCB's in Michigan.

I think, too, as an outgrowth of this program now that has been initiated at both State and Federal level, that Monsanto Chemical Company has withdrawn certain compounds from the market. They have also made arrangements to take, say, the end products, or the wastes, back to their factories for disposal. So there is quite a little under way, to my knowledge.

MR. STEIN: Again, if I read Dr. Mount's testimony correctly, the plea for funding for research and development of PCB's has been fairly fruitful and apparently is forthcoming. So that is settled.

Now, the question, again, I have to raise: What are we going to do, just wait for the June report before we do anything? Or is there anything that is determined that the conferees might do at this session of the Conference in a recommendation to the Administrator on this problem or in this area, I should say?

MR. MAYO: May I make an observation, Mr.

Chairman?

MR. STEIN: Yes.

MR. MAYO: One of the burdens that the conferees, the State agencies and us on the Federal side operate under continuously, and that is responsibility to apply what resources are necessary to these problems as they occur. And I think most frequently the conferees find themselves in the position of wanting to respond positively to the findings of the Technical Committee, but yet being out of phase with them in terms of the availability of resources.

If we have an opportunity here for the Pesticide Committee to make some specific recommendations as early as possible, so that we can generate them into -- include them into the generation of budgets and work plans for fiscal 1972, I certainly make the plea to do that.

DR. MOUNT: Well, we can certainly do that.

MR. STEIN: All right. Are there any other specifics on this?

MR. CURRIE: Yes, Dr. Mount, does your future study program include the identification of sources of these contaminants? It seems to me that must be the special step after monitoring of the levels of the lake and the fish.

DR. MOUNT: Yes, it does, and it has already been under way, I know, at least in Wisconsin, and perhaps in the other States, too, and this more detailed report that I mentioned will not -- I don't think substantially -- change anything I said here but will provide the blow-by-blow account of where they have been found, and whether or not anything has been done about them.

MR. FRANGOS: Let me respond to your comments on what our experience has been. We, of course, have banned the use of DDT, and we have gone to a Pesticide Review Board whereby the several State agencies have responsibilities. Uses of the other pesticides are being restricted.

The other obvious thing to do, of course, is to see whether there are any point sources. In at least two of the instances that you are referring to, Dr. Mount, we were able to trace this thing back, and what we found was, in both instances, a moth-proofing operation which was washing out into the sewage system and getting into the stream. Those two have since stopped using dieldrin as a moth-proofing agent.

But, again, interestingly enough -- and one of these operations, which was a dying of wool yarn -- even when they stopped the use of the product, we were able to, we think, get within the limitations of the analytical capabilities, as it were.

On the virgin wool that was coming in, there were traces of dieldrin that we think may have gone all of the way back to sheep-dipping. It is this kind of a problem that we have got. Now, some of the other high readings that we have gotten in water or the fish come from, I think, general agricultural type application.

DR. MOUNT: Perhaps one of the things that could be done by the Conference is to bring every pressure or every effort to bear that you can to ensure that the State programs receive any support that they can that we can give them to continue on, because one of the worst things that could happen right now would be for this monitoring to die. We are just now beginning to get the fruit of it.

MR. MILLER: Mr. Chairman, I was going to say that we certainly hope and expect that we will receive the grant to continue the pesticide program in Indiana, And while we have not banned pesticides, we have done a detailed study, and we have a very small drainage area to Lake Michigan, and we don't find any major source or major use of DDT in this area.

And I think one of the things that Mr. Frangos touched upon is very important, because one of the minor sources that we have found were the dry cleaning establishments, and the solutions that they do use for dry cleaning often contained DDT for moth-proofing, and these end up

-- and even new clothing that are dyed and dry cleaned where they are not using DDT in them. So that, in our modern society, we are using DDT in a lot of places that we hadn't anticipated and this may be some of the source of the dye rather than insecticides and pesticides that are used.

DR. MOUNT: It might well be that some increased effort on looking at sewage treatment plant discharges for these pesticides might be in order in that it certainly appears that the problems are not at all unique to the agricultural areas, that they are in the industrialized or urbanized areas.

MR. STEIN: Right. I don't want to look for any problems where we don't have one.

MR. PURDY: Mr. Chairman, I would like to speak to a point that Dr. Mount made with respect to the continuation of these programs. I think even more than the continuation, that we need to expand them into the PCB's, metallic acid or metallic salts.

We did file for a continuation of this pesticide grant. We were turned down. We followed this up with a letter to Administrator Ruckelshaus, and we received a letter last week from Commissioner Dominick indicating that the funding situation had improved and that we should resubmit our application for a grant. I think it might be worthwhile for the conferees -- I don't know whether the Federal conferee can join in -- but from the standpoint of the States, that we strongly support the work of this committee and ask that they expand it into the areas of PCB's more than they have in the past, and to metallic salts, and that we attempt to finance this from all possible sources.

MR. MAYO: Mr. Purdy, I don't have very much luck getting grants for myself, but I surely wouldn't hesitate at all to endorse the State efforts in that direction.

MR. STEIN: Do we find that the conferees agree with that?

If they do, we will include that as a recommendation by the conferees.

MR. CURRIE: Mr. Chairman, could we make the recommendation more specific? It seems to me that the report we now have establishes a very substantial suspicion that pollution is occurring. Therefore it seems to me our recommendation should say that, first of all, monitoring should continue; secondly, that sources of these pollutants should be identified; and, third, that the committee recommend specific action to be taken by this conference, significantly in advance of the next meeting.

MR. STEIN: Are there any comments on that? If that is agreeable, that is fine.

Thank you very much, Dr. Mount.

We go to Status of Compliance with Conference Recommendations. We want to go through that, but I would ask that we summarize this, if possible.

May we call on the Federal conferee?

MR. MAYO: The presentation on the Status of Compliance will be made by Mr. Pratt of the Region V office, and, Mr. Pratt, I would make the suggestion that you start perhaps somewhere down near the bottom of the second page.

STATEMENT OF GLENN PRATT, SANITARY ENGINEER, OFFICE OF REGULATORY PROGRAMS, WATER QUALITY OFFICE, EPA, REGION V, CHICAGO, ILLINOIS

MR. PRATT: I was going to, and I would like the paper to appear as if read in the transcript and I will start at the bottom of the second page.

(The above referred to report follows in its entirety.)

LAKE MICHIGAN ENFORCEMENT CONFERENCE

SUMMARY STATEMENT AS OF MARCH 1,1971

STATUS OF COMPLIANCE WITH ABATEMENT SCHEDULES

MUNICIPALITIES AND INDUSTRIES

On the basis of a written request to the Secretary of the Interior from the Honorable Otto Kerner, Governor of Illinois, dated November 22, 1967, as well as on the basis of reports, surveys, or studies, the Secretary of the Interior on December 16, 1967, called a conference in the matter of pollution of Lake Michigan and its tributary basin (Wisconsin-Illinois-Indiana-Michigan) under the provisions of Section 10 of the Federal Water Pollution Control Act, as amended (33 U.S.C. 466 et seq.). The conference was held on January 31, February 1-2, February 5-7, March 7-8, and March 12, 1968, in Chicago, Illinois.

The following recommendations dealt with the treatment of direct discharge of municipal and industrial wastes:

1. Waste treatment is to be provided by all municipalities to achieve at least 80% reduction of total phosphorus and to produce an effluent that will not result in degradation of Lake Michigan's water quality. Such treatment will provide compliance with the water quality standards for Lake Michigan as approved by the Secretary of the Interior and the appropriate State water pollution control agency of Illinois, Indiana, Michigan or Wisconsin. This action is to be substantially accomplished by December 1972.

2. Industries not connected to municipal sewer systems are to provide treatment so as not to result in the degradation of Lake Michigan's water quality and to meet the water quality standards for Lake Michigan as approved by the Secretary of the Interior and the appropriate State water

pollution control agency of Illinois, Indiana, Michigan or Wisconsin. This action is to be substantially accomplished by December 1972.

3. Within six months each State water pollution control agency shall list the municipalities and industries discharging wastewater to the Lake Michigan Basin. The United States Department of the Interior will provide a comparable list of Federal installations. Each source so listed will indicate whether it discharges pollutants, including nutrients, having a deleterious effect on the Lake Michigan water quality. Detailed action plans for treatment of all waste having deleterious effect on the water quality of Lake Michigan are to be developed. Such plans shall identify the principal characteristics of the waste material now being discharged, the quantities, the proposed program for construction or modification of remedial facilities and a timetable for accomplishment, giving target dates in detail. This list shall be presented to the conferees for their review and consideration. Pollution sources shall be added to or removed from the list by formal action of the conferees.

4. Continuous disinfection is to be provided throughout the year for all municipal waste treatment plant effluents. This action is to be accomplished as soon as possible and not later than May 1969.

9. Continuous disinfection is to be provided for industrial effluents containing pathogenic organisms, or organisms which indicate the presence of such pathogens, which may have a deleterious effect on persons coming into contact with Lake Michigan waters.

At the February 25, 1969, and May 7, 1970, reconvened sessions of the conference the State and Federal conferees submitted detailed action plans for treatment of municipal and industrial discharges having a deleterious effect on the water quality of Lake Michigan. Since these sessions the conferees have proceeded to issue necessary orders to all dischargers and work has commenced on designing and constructing necessary facilities. A summary, by state, of those dischargers which are on schedule, those less then one year behind schedule, and those over one year behind schedule follows:

MUNICIPALITIES*

STATE	TOTAL	ON SCHEDULE	LESS THAN 1 YR. BEHIND	MORE THAN 1 YR. BEHIND
Illinois	7	7	--	--
Indiana	25	19	2	4
Michigan	88	55	33	--
Wisconsin	61	37	10	14

INDUSTRIES

STATE	TOTAL	ON SCHEDULE	LESS THAN 1 YR. BEHIND	MORE THAN 1 YR. BEHIND
Illinois	5	3	--	2
Indiana	27	23	2	2
Michigan	5	5	--	--
Wisconsin	41	26	15	--

FEDERAL INSTALLATIONS

	TOTAL	ON SCHEDULE	LESS THAN 1 YR. BEHIND	MORE THAN 1 YR. BEHIND
	18	18	--	--
TOTAL	277	193	62**	22

*Does not include schedules for Storm & Combined Sewer or Non-Point Discharges.
**40 of these are three months or less behind schedule of interim dates.

Of the 277 dischargers required to construct treatment facilities 193 are presently on schedule, 58 have not met interim dates, and 26 have not met final dates. Of those not in compliance, 63 are municipalities and 21 are industries. Also, of those not now in compliance, 45 are three months or less behind schedule, 17 are between three months and one year behind schedule, and 22 are over one year behind schedule. Following is a detailed listing of all dischargers behind schedule:

INDIANA

MUNICIPALITIES

TOTAL	ON SCHEDULE	LESS THAN 1 YR. BEHIND	MORE THAN 1 YR. BEHIND
25	19	(2) Hammond (CS) 12-31-70 Whiting (CS) 12-31-70	(4) Ashley (Dis) F12-31-69 Ligonier(Dis) F12-31-69 South Bend(Dis)F12-31-69 Elkhart (Sec) F12-31-69

INDUSTRIES

TOTAL	ON SCHEDULE	LESS THAN 1 YR. BEHIND	MORE THAN 1 YR. BEHIND
27	23	(2) Cities Service F 12-31-70 Penn-Central Trans. F 6-1-69	(2) American Motors F 12-31-69 U.S. Steel (Gary) F 12-31-69

CS - Combined Sewers (Final Date)
F - Complete Construction (Final Date)
Dis - Install or Operate Disinfection (Final Date)

ILLINOIS

MUNICIPALITIES

TOTAL	ON SCHEDULE	LESS THAN 1 YR. BEHIND	MORE THAN 1 YR. BEHIND
NSSD (7 Plants & 2 Bypasses)	7	--	--

INDUSTRIES

TOTAL	ON SCHEDULE	LESS THAN 1 YR. BEHIND	MORE THAN 1 YR. BEHIND
5	3	--	(2) U.S. Steel - Waukegan F 12-31-68 U.S. Steel - South Works F 12-31-68

F - Complete Construction (Final Date)

FEDERAL INSTALLATIONS

TOTAL	ON SCHEDULE	LESS THAN 1 YR. BEHIND	MORE THAN 1 YR. BEHIND
18	18	--	--

MICHIGAN

MUNICIPALITIES

TOTAL	ON SCHEDULE	LESS THAN 1 YR. BEHIND	MORE THAN 1 YR. BEHIND
88	55	(33) Albion D 9-70	--
		Allegan D 1-71	
		Eaton Rapids D 3-1-71	
		Battle Creek D 2-71	
		Big Rapids D 12-70	
		Boyne City D 9-70	
		Cadillac D 9-70	
		Chikaming Twp. F 12-70	
		Delhi Twp. D 1-71	
		East Lansing C 9-70	
		Fremont D 9-70	
		Gladstone D 12-70	
		Grandville D 9-70	
		Harbor Point Assoc. D 12-70	
		Hillsdale D 9-70	
		Iron Mountain-Kingsford D 3-1-71	
		Ionia D 12-70	
		Iron River D 1-71	
		Mason D 12-70	
		Menominee D 9-70	
		New Buffalo D 10-70	
		New Buffalo Twp. F 12-70	
		Norway D 2-71	
		Otsego D 9-70	
		Paw Paw D 9-70	
		Portland D 12-70	
		South Haven D 12-70	
		Vicksburg D 9-70	
		Lansing D 3-1-71	
		Whitehall D 9-70	
		Wyoming D 1-71	
		Zeeland D 12-70	
		Ludington D 3-1-71	

INDUSTRIES

TOTAL	ON SCHEDULE	LESS THAN 1 YR. BEHIND	MORE THAN 1 YR. BEHIND
5	5	--	--

D - Detailed Plans (Interim Date)
F - Complete Construction (Final Date)

WISCONSIN

MUNICIPALITIES

TOTAL	ON SCHEDULE	LESS THAN 1 YR. BEHIND	MORE THAN 1 YR. BEHIND
	37	(10) Appleton D 1-71	(14) Clintonville (Dis) F 5-69
		Cedarburg SC 1-71	Franklin SD (Dis) F 5-69
		Fond du Lac D 1-71	Germantown (Exp) F 12-68
		Green Bay MSD D 1-71	Kimberly (Dis) F 5-69
		Manitowoc D 1-71	Kiel (Dis) F 5-69
		So.Shore Plt.-MMSC D 7-70	Little Chute (Dis) F 5-69
		Racine D 1-71	
		Sheboygan B 8-70	Jones Is.Plt.-MMSC (Dis) F5-69
		Two Rivers D 6-69	
		Waupaca D 1-71	Neenah-Menasha (Dis) F5-69
			Oak Creek Sub.#3 (Dis) F5-69
			Oconto (Dis) F5-69
			Oshkosh (Dis) F5-69 (Partial)
			Portage (Dis) F5-69
			Racine Co.Hwy.&Ofc.Bldg. (Dis) F 5-69
			Thiensville (Dis) F 5-69

INDUSTRIES

TOTAL	ON SCHEDULE	LESS THAN 1 YR. BEHIND	MORE THAN 1 YR. BEHIND
41	26	(15) American Can D 1-71	--
		Badger Paper Mills D 1-71	
		Bergstrom Paper Co. D 1-71	
		Charmin Paper Prod. D 1-71	
		Combined Paper Mills D 1-71	
		Consolidated Papers D 1-71	
		Geo.A. Whiting Paper D 1-71	
		John Strange Paper D 1-71	
		Kimberly-Clark (Badger Globe Mill) D 1-71	
		" " (Kimberly Mill) D 1-71	
		" " (Lakeview Mill) D 1-71	
		" " (Neenah Division) D 1-71	
		Riverside Paper Corp D 1-71	
		Scott Paper Co D 1-71	
		Thilmany Pulp & Paper D 1-71	

SC - Start Construction (Interim Date)
[illegible] - Detailed Plans (Interim Date)
D. - Install or operate Disinfection (Final Date)

It is anticipated that a number of dischargers which have missed interim checkpoints will still complete construction by their scheduled compliance date. However, several other dischargers such as the North Shore Sanitary District, Abbott Laboratories, and Fort Sheridan, which have met interim dates are not expected to complete construction on schedule.

After reviewing anticipated progress, the following estimate was made of the percent of required facilities which will be completed by the required conference date, up to one year beyond the conference date, and over one year beyond the conference date:

ESTIMATED COMPLETION OF REQUIRED FACILITIES (%)

	On Schedule	1 Year Behind	Over 1 Year Behind
Illinois	34	33	33
Indiana	40	40	20
Michigan	50	35	15
Wisconsin	30	30	40
Federal Inst.	82	12	6

MR. PRATT: At the February 25, 1969, and May 7, 1970, reconvened sessions of the Conference, the State and Federal conferees submitted detailed action plans for treatment of municipal and industrial discharges having a deleterious effect on the water quality of Lake Michigan. Since these sessions, the conferees have proceeded to issue necessary orders to all dischargers and work has commenced on designing and constructing necessary facilities. A summary, by State, of those dischargers which are on schedule, those less than 1 year behind schedule, and those over 1 year behind schedule follows. And I don't know if the conferees want me to go down the list.

MR. STEIN: Unless you have any specifics you want to point out.

MR. PRATT: No, I think that this appears for the record.

Of the 277 dischargers required to construct treatment facilities 193 are presently on schedule, 38 have not met interim dates, and 26 have not met final dates. Of those not in compliance, 63 are municipalities and 21 are industries. Also, of those not now in compliance, 45 are 3 months or less behind schedule, 17 are between 3 months and 1 year behind schedule, and 22 are over 1 year behind schedule. Following is a detailed listing of all dischargers behind schedule. It is anticipated that a number of dischargers which have missed interim check points will still complete construction by their scheduled compliance date. However, several other dischargers such as the North Shore Sanitary District, Abbott Laboratories, and Fort Sheridan, which have met interim dates, are not expected to complete construction on schedule. And I think I will end with that.

MR. STEIN: Any comment?

MR. CURRIE: Yes, indeed.

We have now come, after we are all too tired to be able to consider it, to the essential business of this Conference which is seeing to it whether or not people are living up to the earlier Conference recommendations. We can't possibly be expected to make any sense whatever of this presentation which we have just this minute received, which tells us in cryptic and cipher form about the status of several hundred dischargers, and I wonder what it is contemplated that we can possibly do with this presentation at this time, and I wonder whether the Conference ever intends to get down to the business of seeing to it that people are complying with its recommendations.

MR. STEIN: Well, Mr. Currie, it seems to me that if you are hearing for the first time the Illinois communities that are more than a year behind or 2 years behind, and this is cryptic and news to you, I think that is quite a revelation.

I was going to ask the same question. We have 62 less than a year behind; 22 more than a year behind; we have other avenues for direct court action, and I don't know -- maybe these are being reviewed for the direct court action. I know that is what we are doing in the Federal Government, and I am not too tired to look at this. As a matter of fact, my ears perk up when I see this, and see how many are behind and how many are not meeting the schedule, and I think as public servants we can't afford to be too tired to look at this. I am not.

MR. PURDY: Mr. Stein -- have you completed?

MR. STEIN: Yes.

MR. PURDY: Possibly Mr. Currie wants to follow this up before I start.

MR. STEIN: Go ahead.

MR. CURRIE: Go ahead, Mr. Purdy.

MR. PURDY: Mr. Stein, I have noted on the final table on the estimated completion of required facilities that the total for Michigan there adds up to, I believe, 100; and on page 3, the municipalities, we have 88, and industries 5, which I believe totals to 93. I don't know, at this point which one is right, and where the error lies.

MR. PRATT: The table is in percentages.

MR. PURDY: It is in percentages?

MR. PRATT: Yes. They all add to 100.

MR. PURDY: Okay.

That just emphasizes Mr. Currie's statement that we are all tired, I think, but --

MR. STEIN: I guess you are tired.

Let me ask Mr. Mayo a question. For those that are behind, do you contemplate recommending remedial action on the Federal level, Mr. Mayo?

MR. MAYO: Well, the instructions that I have from Commissioner Dominick are to keep his office advised of the dischargers that are behind schedule, at least those that have passed the final completion date, and to provide his office with questionnaires stating the facts with respect to each of those delinquencies, and the relationship of those dischargers to violations of Water Quality Standards or other Federal statutes, as a means for a judgment being made on whether or not there should be a Federal action under the terms of either the Federal Water Quality Act, or the 1899 Refuse Act. We have proceeded in that manner.

MR. PURDY: Mr. Stein, I might say, on behalf of

Michigan, that we are ready and will furnish Mr. Mayo with the detailed information on each of those that are behind so that he will have all the data at his disposal to reach a decision on the sort of recommendation that he should make.

Most of these, the Water Resources Commission has not extended the time for their compliance, so that they remain in a strong position to start enforcement action as they deem it necessary in the courts.

I should point out that Grand Haven now should be added to the list of those that are not on schedule. They would have to be added to the "less than one year behind." Grand Haven proceeded, had their final plans approved. They took construction bids. They had let the contracts subject to the sale of their bonds. Unfortunately they were taken to court by the citizens in the area that protested the location of the plant. A preliminary injunction was obtained. Grand Haven had that dismissed. This was appealed to a higher court. This delayed the sale of bonds until the contractor would no longer hold his bids, and so that plant has now fallen behind due not to an unwillingness on the part of Grand Haven to proceed, but due to the fact that they could not proceed in view of the legal problems facing them.

MR. STEIN: I want to make it clear to all of the conferees that right now -- and I think Mr. Purdy's description of Grand Haven points up the problem as well as any -- right now we are going through all the schedules for Lake Michigan as well as the other Conferences. If any are behind date, certainly if they miss a final date, or are significantly behind in interim date, it looks to us like they can't get a final date, we are carefully reviewing whether we are going to propose court action to get rapid compliance.

However, we recognize precisely what Mr. Purdy has said -- that there is no point in spending a lot of time and energy in a court action when you are not going to really push the completion date forward. If you have a situation like that, where something has been tied up in a local suit or things are moving as fast as they possibly can, even if you filed the court suit, given the limited resources that we all have, it might be more productive to put our efforts somewhere else.

So I think it isn't just as simple as we have all found out in going down the list and seeing who is behind. That is the first step.

The second step, we have to determine, is why they are behind.

And the third and most important thing is if we file that case that we really are going to do any good and hurry things up because there are no dearth of cases, there are plenty of cases that we have to file through this. And I do think that all of the States can expect us to be with them and be analyzing anyone who shows up as a laggard on these lists very, very carefully in detail, case by case. And as soon as we get a recommendation from Mr. Mayo, I can assure you we are going to forward that as rapidly as possible and take appropriate action where it is indicated.

MR. MILLER: Mr. Chairman.

MR. FRANGOS: Mr. Chairman.

MR. MILLER: Go ahead, Tom.

MR. FRANGOS: I couldn't agree more with the statements that you have just made. Of course, we have got, I suspect, the largest burden at least in terms of numbers here, but I think at least the statistics need some comment on my part. If you look at those that are less than a year behind, for the most part they relate to the submission of plans by January of this year by industries, and a number of municipalities in the southern part of the Fox River tributary to Green Bay; and that situation we have been working with the Fox Valley Council of Governments to determine a regional — if we can't come up with a regional system for that area. And, therefore, a large number of those have not come forward with individual plans pending the outcome of a regional system.

But the time is running out there quite obviously and we are going to have to make a decision very soon there.

On those that are more than a year behind -- again, this is just a general observation -- for the most part they do relate to disinfection. I think the Conference has been through that discussion previously, but I believe, in the main, most of those have either -- are now either providing disinfection or are in the process of constructing facilities that will secure the disinfection.

One further comment that I would have: I think that I can understand Mr. Currie's concern for getting this kind of information. I don't think it has been forthcoming. I don't think that anyone is necessarily to blame for not providing this; I just think our system hasn't been very good.

I would say to him, because I have sensed his concern about his wanting to know what we are doing in Wisconsin -- and if he has got any question about any entity at any time -- that our records are always open to him, and that beyond that we can provide him and other conferees any information they would like on this.

MR. STEIN: Any other comments or questions?

MR. MILLER: Mr. Chairman, I would like to comment that we do have a report that we prepared updating the status of all of the municipalities and industries in Indiana. But I would say that on those that are listed as being behind, either one or two years, that either they are now under construction or the Board has held hearings with them with the exception of Cities Service, and we have some question whether it belongs on this list, in that we have carried them as complying with the conference requirements and what they are now doing is advanced waste treatment over and above conference requirements, so that I think that the Indiana Stream Pollution Control Board is following through on these, and we expect to do that in the future.

(The above-referred to report follows in its entirety.)

PROGRESS REPORT
FOR
CONFERENCE
ON
POLLUTION OF LAKE MICHIGAN AND ITS TRIBUTARY BASIN
(ILLINOIS - INDIANA - MICHIGAN - WISCONSIN)

RECONVENED MARCH 23, 1971
CHICAGO, ILLINIOS

ON BEHALF OF
THE
INDIANA STREAM POLLUTION CONTROL BOARD
AND
THE STATE OF INDIANA

MARCH, 1971

INTRODUCTION

The January, 1968, reports to the Conferees for the Conference on Pollution of Lake Michigan and its Tributary Basin provided a description of the Indiana portion of the Basin, a summary of water uses, and excerpts from the Implementation Plans of the Water Quality Standards for the Lake Michigan and the St. Joseph River Basins. The March, 1970, report to the Conferees updated the listing of municipalities and industries and provided details on the status of wastewater treatment facilities. A supplemental report dated May 4, 1970, provided a timetable for completion of additional facilities required to meet Water Quality Standards and/or recommendations of the Conferees.

The following report provides current information on the status of municipal and industrial wastewater treatment and control measures in the Indiana drainage area tributary to Lake Michigan.

MUNICIPAL SEWAGE TREATMENT

Portage, Elkhart, and Ligonier have sewage works projects under construction which include phosphorus removal and effluent chlorination. Lagrange has completed construction of effluent chlorination facilities. Construction is anticipated in the near future for connection of the East Gary sewage to the Gary Sanitary District sewers for treatment at the District's main plant. Treatment for sewage from East Gary is now provided by the District's Miller plant which needs extensive improvements in order to continue to provide effective treatment.

Construction of sewage works improvements including phosphorus removal and effluent chlorination should be undertaken in the near future at South Bend. This project has recently been certified for Federal and State grant funds. Early construction is also anticipated by the Town of Middlebury which will also provide wastewater treatment for the Middlebury Cooperative Creamery. In addition, final plans and specifications for plant improvements including phosphorus removal have been submitted by Goshen, Kendallville, and Valparaiso. The municipalities of Gary, East Chicago, and Hobart have submitted preliminary engineering reports and Chesterton, Crown Point, Michigan City, Angola, Lagrange, and Nappanee have authorized engineers to undertake studies relative to phosphorus removal.

Michigan City has made substantial progress towards separation of combined sewers in major areas of the City. Consideration is being given to utilization of deflatable tanks at other overflow points serving isolated areas. Mishawaka and South Bend have provided combined sewer separation in some areas and East Chicago is completing a demonstration project to provide control of pollution from combined sewers serving approximately 1/3 of the City. East Chicago also has separate storm sewers under construction in other areas of the City. East Gary is proposing separate storm sewers for a portion of its drainage area and the Gary Sanitary District has submitted a master plan for sewer improvement .

Enforcement hearings have been held with the City of Whiting and the City of Hammond relative to projects for control of combined sewer overflows and disinfection of storm water discharges to Lake Michigan. An order issued to the City of Hammond provided for its project to be completed by December 31, 1970. The order also required completion of plant improvements by December 31, 1972. Final plans have been approved, financing procedures started, and construction bids are to be received April 22, 1971. Hammond plans to finance the storm water project and the sewage plant improvement project with one bond issue. The City of Whiting entered objections to the Board's order which provided for completion of the Whiting project by May 1, 1971. The City has submitted a preliminary engineering report which proposed a new sewage treatment plant to treat all flow from existing combined sewers with effluent discharge to Lake Michigan. The Board has not found this proposal satisfactory because it believes that the sewage from Whiting should continue to discharge to the Hammond sewer system for treatment. The effluent from the Hammond plant normally discharges to the Illinois Waterway.

Other enforcement actions have been held with the municipalities of Angola, Ashley, Kendallville, Ligonier and Valparaiso relative to construction of required sewage works improvements.

Federal grant applications filed by Cromwell, East Gary, Gary, Goshen, Hammond, Independence Hill Conservancy District, Kendallville, Ligonier, Valparaiso, and Topeka request over $12 million in Federal and $6 million in State grant funds to help finance construction of projects estimated to cost approximately $29 million.

Projects now under construction by Elkhart, Portage, and Wolcottville and projects proposed for early construction at South Bend and Middlebury cost approximately $21 million including $6.6 million in Federal and $3.2 million in State grant funds.

On the basis of plans that have been submitted and those now underway, it is indicated that, if adequate State and Federal funds are available, practically all of the Indiana municipalities could have projects for phosphorus removal facilities completed by the end of 1972. The Sanitary District of Gary, which plans major plant improvements in addition to phosphorus removal facilities and the Cities of East Chicago and Mishawaka will not meet this date unless progress towards completion of final plans and start of construction is accelerated. The status of municipal wastewater treatment facilities is shown in Appendix I.

Surveillance of wastewater treatment plant operations and the requirement for submission of meaningful monthly reports has continued. In general, this activity, plus the requirement for certification of operators in charge of wastewater treatment plants, has improved the operation and maintenance of these facilities. However, the control of pollution from combined sewer overflows and storm sewer discharges is required to meet water quality standards during wet weather periods. Emphasis has been continued on the requirement for semi-public installations to connect with area-wide sewerage facilities where practicable and for improved operation and maintenance of existing plants.

INDUSTRIAL WASTE TREATMENT

Continued progress has been made on construction of waste treatment facilities at Indiana industries. A total of 8 projects at 7 industries have been completed since the Third Session of the Conference on March 31, 1970. A total of 36 projects have been completed since the First Session of the Conference on January 31, 1968.

Three projects were completed at the steel mills during the second and third quarter of 1970. These were the blast furnace treatment system and north lagoon system at Youngstown Sheet & Tube Company and the terminal treatment plant at Inland Steel Company.

On May 26, 1970, an enforcement hearing was held with U. S. Steel Corporation, Gary Works, Gary, concerning pollution of the Grand Calumet River, Indiana Harbor Ship Canal and Lake Michigan. As a result of the hearing an order to abate pollution was issued to the Corporation on December 1, 1970, over the objections of U. S. Steel Corporation. The order provides for submission of plans for pollution control facilities by July 1, 1971, and completion of construction of control facilities by December 31, 1972. The Corporation has filed for judicial review of the Board's action in Lake County Superior Court. The matter is pending. The Corporation reports that plans for additional waste control facilities are being developed.

American Oil Company, Whiting and Atlantic Richfield Company, East Chicago, completed advanced waste treatment facilities during December 1970. These systems are in the process of start up and evaluation. Advanced waste treatment facilities are under construction at Cities Service Oil Company, East Chicago, which are scheduled for completion in

June, 1971. U. S. Gypsum Company, East Chicago, completed process changes during late 1970 and has eliminated all waste discharge to the Indiana Harbor Ship Canal. The Ameridan Maize Products Company, Hammond, is developing plans for advanced waste treatment facilities for completion by December 1, 1972. The preliminary plans are due by March 1, 1971. E. I. du Pont de Nemours & Company, Inc., East Chicago, is also developing plans for additional waste treatment facilities and upgrading of present facilities. These improvements will be completed by December 31, 1972.

Three industries in the St. Joseph River Basin do not have adequate wastewater treatment or control facilities. Enforcement action has been initiated against General Products Division, American Motors Corporation, South Bend; Gentner Packing Company, South Bend; and Pennsylvania New York Central Transportation Company, Elkhart, in order to acquire firm commitments for construction of waste treatment facilities.

Waste treatment facilities were completed at Middlebury Cooperative Creamery Company, Middlebury, and Angola Reduction Company, Angola, in December, 1970. Waste treatment facilities are under construction at the Pennsylvania New York Central Transportation Company, Elkhart; Gentner Packing Company, South Bend; and General Products Division, American Motors Corporation, South Bend. Completion of these projects will occur during 1971. The Continental Can Company, Elkhart, ceased operations on February 27, 1971. The Lehman Veal and Poultry Packers, Wakarusa, closed during late 1970.

A listing of industrial plants appears in Appendix II. The listing of industrial projects completed since March, 1970, and the timetables for construction of industrial wastewater treatment facilities appear in

Appendix III. The status of completion of interim actions leading to construction of required municipal and industrial wastewater treatment facilities appears in Appendix IV.

SUMMARY

Review of water quality monitor data and operating reports from municipalities and industries disclose a continuing improvement in water quality. Recent reports of the Department of Water and Sewers, City of Chicago, confirm that the quality of raw lake water continues to improve.

Efforts will be continued to insure the completion of projects now underway or in planning stages for sewage works improvements, including phosphorus removal, not later than the end of 1972. Completion of these municipal projects plus effective operation of industrial waste treatment facilities recently completed will provide further improvement in water quality. The control of pollution from combined sewer overflows, storm water discharges, and surface water runoff from municipal and industrial areas will be required in order to meet and maintain water quality standards.

APPENDIX I

Municipal Waste
Lake Michigan Basin
Lake, Porter, and LaPorte Counties

Municipality	Population 1970 (or Later Census)	Type of Treatment	Year Completed	Design Flow mgd	Present Flow mgd	Receiving Stream	Improvements Required (1)	Time-Table	Remarks
Chesterton	6,177	Activated sludge, chlorination	1963	1.50	1.02	Little Calumet R., Burns Ditch	Phosphorus removal	1972	Engineer employed
Crown Point	10,931	Activated sludge, chlorination	1966*	1.80	1.05	Beaver Dam Ditch Deep River Burns Ditch	Phosphorus removal,	1972	Under Study, Engineer employed
							Advanced waste treatment	1977	-
East Chicago	46,982	Activated sludge, chlorination	1960*	20.00	14.00	Grand Calumet R., Indiana Harbor	Advanced waste treatment,	As soon as practicable	0.75 mgd - Pilot studies underway with Federal grant.
							Phosphorus removal	1972	-
							Storm water disinfection and control	As soon as practicable	Demonstration project underway with Federal grant.
East Gary	9,858	Trickling filter, chlorination	1960*	1.30	1.00	Burns Ditch	-	-	Contract signed for connection to Gary. Final plans approved. (2)
Gary	175,415	Activated sludge, chlorination	1965*	60.00 +20.00 Additional primary capacity	45.50	Grand Calumet R., Indiana Harbor	Advanced waste treatment	As soon as practicable	Preliminary engineering report complete. (2)
							Phosphorus removal	1972	Preliminary-engineering report complete.
							Storm water disinfection and control	As soon as practicable	Preliminary engineering report complete.

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*Last major improvement

(2) Applications on file for construction grants.

APPENDIX I

Municipal Waste
Lake Michigan Basin
Lake, Porter, and LaPorte Counties (continued)

Municipality	Population 1970 (or Later Census)	Type of Treatment	Year Completed	Design Flow mgd	Present Flow mgd	Receiving Stream	Improvements Required (1)	Time-Table	Remarks
Hammond	107,790	(Treatment required of storm and combined sewer overflows to Lake Michigan)					Disinfection and control	1970	Final plans approved. SPCB order issued. (2)
Whiting	7,247	(Treatment required of storm and combined sewer overflows to Lake Michigan)					Disinfection and control	1970	Preliminary report submitted. SPCB order issued. (2)
Hobart	21,485	Activated sludge, chlorination	1962*	2.00	1.77	Deep River, Burns Ditch	Phosphorus removal Advanced waste treatment	1972 1977	Preliminary report received. Under Study, engineer employed.
Michigan City	39,369	Activated sludge, chlorination	1968*	15.00	10.30	Trail Creek	Advanced waste treatment Phosphorus removal	As soon as practicable 1972	Under Study, engineer employed. Under Study, engineer employed.
Portage	19,127	Activated sludge phosphorus removal chlorination	-	2.5	-	Burns Ditch	-	1970	Under construction. Project includes phosphorus removal.
Porter	3,058	Connected to Chesterton	-	-	-	Calumet River Burns Ditch	-	-	-
Valparaiso	20,020	Activated sludge, chlorination	1954	2.00	2.46	Salt Creek, Little Calumet, Burns Ditch	Expansion, Phosphorus removal, Advanced waste treatment	1972 1972 1977	Final plans approved. (2) SPCB hearing scheduled. -

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(1) 80 percent phosphorus reduction required of municipalities by 1972 (excluding Hammond and Whiting).
* Last major improvement
(2) Applications on file for construction grants.

APPENDIX I

Municipal Wastewater Treatment
Lake Michigan Basin - St. Joseph River

Municipality	Population 1970 (or Later Census)	Type of Treatment	Year Completed	Design Flow mgd	Present Flow mgd	Receiving Stream	Improvements Required	Time-Table	Remarks
Albion	1,498	Lagoon, Chlorination	1968	0.15	0.08 (est.)	Tributary to Elkhart River	-	-	-
Angola	5,117	Trickling filter, chlorination	1963*	0.85	0.80	Pigeon Creek, Pigeon River	Phosphorus removal Advanced waste treatment	As soon as practicable 1977	Preliminary report submitted. SPCB hearing scheduled.
Ashley	721	Activated sludge, 7-day terminal lagoon	1966	0.08	0.05	Tributary to Turkey Creek, Pigeon River	Chlorination	1969	Under Study
Cromwell	475	None	-	-	-	Turkey Creek, Elkhart River	Secondary treatment and chlorination	1972	Preliminary report submitted. (2)
Elkhart	43,152	Primary, chlorination	1955	12.0	12.0 to 15.00	St. Joseph R.	Expansion and secondary treatment, Phosphorus removal	1969 1972	Under construction. Project includes phosphorus removal.
Fremont	1,043	Trickling filter, chlorination	1958	0.15	0.12	Tributary to Crooked Creek, Fawn River	-	-	-

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* Last major improvement
(2) Applications on file for construction grants.

APPENDIX I

Municipal Wastewater Treatment
Lake Michigan Basin - St. Joseph River (continued)

Municipality	Population 1970 (or Later Census)	Type of Treatment	Year Completed	Design Flow mgd	Present Flow mgd	Receiving Stream	Improvements Required	Time-Table	Remarks
Goshen	17,171	Activated sludge, limited chlorination	1963*	3.50	2.40	Elkhart River	Chlorination and phosphorus removal	1972	Final plans submitted. (2)
Kendallville	6,383	Trickling filter chlorination	1958*	1.44	1.65	Henderson Lake North Branch Elkhart River	Expansion, Phosphorus removal	As soon as practicable	Under SPCB order. Final plans submitted.
Lagrange	2,053	Trickling filter, chlorination	1958	0.38	0.19	Fly Creek Pigeon River		1969	Project completed.
							Phosphorus removal	1972	-
Ligonier	3,034	Primary	1941	0.20	0.25	Elkhart River	Expansion and secondary treatment, including phosphorus removal	1972	Under construction. (2)
Milford Junction	1,264	None	-	-	-	Turkey Creek, Elkhart River	Secondary treatment and chlorination	1972	Plans approved.
Mishawaka	35,517	Activated sludge, chlorination	1952 1966*	8.30	9.00(1)	St. Joseph R.	Expansion and phosphorus removal	1972	Under study
Nappanee	4,159	Activated sludge, chlorination	1963	0.90	0.70	Tributary Turkey Creek, Elkhart River	Phosphorus removal	1972	Under Study

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* Last major improvement.
(1) All dry weather flow is receiving secondary treatment.
(2) Applications on file for construction grants.

APPENDIX I

Municipal Wastewater Treatment

Lake Michigan Basin - St. Joseph River (continued)

nicipality	Population 1970 (or Later Census)	Type of Treatment	Year Completed	Design Flow mgd	Present Flow mgd	Receiving Stream	Improvements Required	Time-Table	Remarks
South Bend	125,580	Activated sludge	1955	24.0(Sec) 24.0(Prim)	32.00(1)	St. Joseph River	Chlorination Expansion and Phosphorus removal	As soon as practicable 1972	Plans approved, certified for construction grants.
Syracuse	1,546	Trickling filer, chlorination	1962	0.25	0.20	Turkey Creek, Elkhart River	-	-	-
Topeka	677	None	-	-	-	Little Elkhart R.	Secondary treatment and chlorination	1972	Preliminary report received. (2)
Wakarusa	1,160	Lagoon, chlorination	1970	-	-	Baugo Creek Elkhart River	-	-	-
Wolcottville	915	Trickling filter, chlorination	-	0.16	-	Little Elkhart R.	-	-	Under construction.
Middlebury	1,055	Trickling filter, chlorination	-	0.2	-	Little Elkhart R.	-	-	Ready for construction, construction grants approved.

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(1) All dry weather flow is receiving secondary treatment.

(2) Applications on file for construction grants.

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APPENDIX II

INDUSTRIAL WASTE TREATMENT CONTROL FACILITIES
LAKE MICHIGAN BASIN

Industry	Sewage Disposal	Industrial Waste Facilities	Status	Waste Flow mgd	Receiving Stream
St. Joseph River					
Angola Reduction Company Angola	Septic tank - absorption system	Grease separation basin and septic tank	A	0.010	Silver Lake
Weatherhead Company Angola	Angola Sewer	Oil separation, ion exchange with water reuse, cyanide destruction, chromium reduction and cyanide isolation facilities	A	0.175	Tributary of Crooked Lake
Bristol Band Instrument Company Bristol	Septic tank - absorption system	Cyanide isolation and soil absorption	A	0.010	None
Continental Can Company Elkhart	Elkhart sewer	Bar screens, chemical treatment and clarification	Plant Closed 1971		
Elkhart Packing Company Elkhart	Septic tank - absorption system	Grease separation, blood collection and soil absorption pond	A	0.040	None
Pennsylvania New York Central Transportation Company Elkhart	Elkhart sewer	Oil separation and soil absorption ponds	I	0.050	Honey Creek
John L. Whisler and Son, Inc. Elkhart	Septic tank - absorption system	Fine screens, blood collection, grease separation and soil absorption ponds	A	0.150	None

APPENDIX II (continued)

Industry	Sewage Disposal	Industrial Waste Facilities	Status	Waste Flow mgd	Receiving Stream
Penn Electric Switch Company Goshen	Goshen sewer	Cyanide isolation and settling tank	A	0.225	Goshen sewer
Pine Manor, Inc. Goshen	Goshen sewer	Grease separation, blood collection and soil absorption pond	A	0.040	None
Kendallville Fertilizer Company Kendallville	Septic tank - absorption system	Septic tanks and waste stabilization pond	A	0.020	Henderson Creek
Springer Corporation Ligonier	Septic tank - absorption system	Oil separation tank	A	0.015	Elkhart River
Middlebury Co-operative Creamery, Inc. Middlebury	Septic tank - absorption system	Holding pond and spray irrigation	A	0.025	None
Cecil Foods, Inc. Milford	Septic tank - absorption system	Soil absorption pond	A	0.020	None
Maple Leaf Farm Processing Plant Milford	Septic tank - absorption system	Waste stabilization pond	A	0.080	Waubee Lake
Indiana-Michigan Electric Company Twin Branch Station Mishawaka	Septic tank - absorption system	Ash settling ponds	A	84.0	St. Joseph River
U. S. Rubber Company Mishawaka	Mishawaka sewer	In-plant control, primary clarification, chemical treatment, flocculation, clarification and vacuum filtration	A	1.300	St. Joseph River
Animal By-Products Corporation New Carlisle	Septic tank - absorption system	Soil absorption pond	A	0.020	None

APPENDIX II (continued)

Industry	Sewage Disposal	Industrial Waste Facilities	Status	Waste Flow mgd	Receiving Stream
New Paris Creamery Company New Paris	Septic tank - absorption system	Aerated lagoon	A	0.225	Turkey Creek
Polo Produce, Inc. New Paris	Septic tank - absorption system	Fine screens, blood collection, grease separation and soil absorption pond	A	0.050	None
County Line Cheese Company Shipshewana	Septic tank - absorption system	Ridge and Furrow irrigation	A	0.015	None
General Products Division, AMC (formerly Kaiser Jeep Corporation) South Bend	Septic tank - absorption system	None	I	0.020	Bowman Creek
Gentner Packing Company South Bend	Septic tank - absorption system	Blood collection, grease separation and anaerobic-aerobic waste stabilization pond system	I	0.215	Autin Ditch
Weatherhead Company Syracuse	Syracuse sewer	Cyanide destruction and cyanide isolation	A	0.225	Turkey Creek
Lehman Veal and Poultry Packers Wakarusa	Plant closed				
Grand Calumet River - Indiana Harbor Ship Canal - Lake Michigan					
Northern Indiana Public Service Co. Bailly Station Baileytown	Septic tank - absorption system - no discharge	Ash disposal with soil absorption of sluicing water - no discharge	A	--	Lake Michigan (cooling water)
American Steel Foundries Company East Chicago	East Chicago Sanitary District	Settling basin	A	0.500	Indiana Harbor Ship Canal
Blaw Knox Company East Chicago	East Chicago Sanitary District	Settling tank and filter	A	0.425	Indiana Harbor Ship Canal

APPENDIX II (continued

Industry	Sewage Disposal	Industrial Waste Facilities	Status	Waste Flow mgd	Receiving Stream
Cities Service Oil Company East Chicago	East Chicago Sanitary District	Oil separation tanks, ammonia-sulfide strippers and separate disposal of waste caustic and acids	**	73.0	Grand Calumet River
E. I. du Pont de Nemours & Co., Inc. East Chicago	East Chicago Sanitary District	Acid neutralization facilities, settling basin and controlled discharge	I	9.60	Grand Calumet River
Inland Steel Company East Chicago	Three trickling filter plants with effluent chlorination	Coke plant cooling water recirculation, phenol extraction, napthalene recovery and discharge of ammonia still wastes to East Chicago Sanitary District. Sewers, scale pits, oil separator, flue dust thickeners, chemical clarification facilities and deep well disposal system for waste pickle liquor	*	900.00	Indiana Harbor Ship Canal and Lake Michigan
M & T Chemicals Company East Chicago	East Chicago Sanitary District	Spent caustic sold for recovery and settling pond	A	0.075	East Chicago sewer system
Mobil Oil Company East Chicago	East Chicago Sanitary District	Oil separators, ammonia sulfide stripper, in-plant control, ballast tank oil separator, separate disposal of waste caustics and acids, air flotation and water reuse	A	2.50	Indiana Harbor Ship Canal

APPENDIX II (continued)

Industry	Sewage Disposal	Industrial Waste Facilities	Status	Waste Flow mgd	Receiving Stream
Atlantic-Richfield Company (formerly Sinclair Refining Company) East Chicago	East Chicago Sanitary District	Oil separators, ammonia sulfide stripper, in-plant control, ballast tank oil separator and separate disposal of waste caustics and acids	*	5.50	Indiana Harbor Ship Canal
U. S. Gypsum Company East Chicago	East Chicago Sanitary District	Settling basin and save-all clarifiers	A	4.50	East Chicago Sewer
Union Carbide Chemical Corporation Linde Air Division East Chicago	East Chicago Sanitary District	Settling ponds and oil separation	A	0.250	Indiana Harbor Ship Canal
Youngstown Sheet and Tube Company East Chicago	East Chicago Sanitary District	Scale pits, oil separators, settling basins, phenol extraction, napthalene recovery, lime still waste to East Chicago sewers, sand filtration, chemical treatment and waste pickle liquor neutralization on hot slag	*	250.00	Indiana Harbor Ship Canal and Lake Michigan
Vulcan Materials Company Gary	Septic tank - absorption system	Spent caustic sold for recovery	A	--	Grand Calumet River
American Maize-Products Company Hammond	Hammond Sanitary District	In-plant control, anaerobic lagoon, aerated lagoon, starch filtrate clarifiers, chlorination and some waste discharged to Hammond sewers	*	14.00	Lake Michigan
Commonwealth Edison Co., Inc. Hammond	Chicago Sanitary District	Fly ash settling bins and bottom ash settling basins	A	1000.00	Lake Michigan

APPENDIX II (continued)

Industry	Sewage Disposal	Industrial Waste Facilities	Status	Waste Flow mgd	Receiving Stream
American Oil Company Whiting	Whiting sewers	Oil separators and aerated lagoon	*	140.00	Lake Michigan
Union Carbide Chemical Corporation Chemicals Division Whiting	Whiting sewers and East Chicago Sanitary District	Oil separators, settling basins and in-plant control	A	54.00	Lake Michigan and Indiana Harbor Ship Canal
Union Tank Car Company Whiting	Hammond Sanitary District	Oil separation and discharge to the Hammond Sanitary District	A	0.030	Hammond sewerage system
American Bridge Division U. S. Steel Corporation Gary	Gary Sanitary District	None (cooling water only)	A	--	Grand Calumet River
Gary Works West (formerly Gary Sheet and Tin Mill) U. S. Steel Corporation Gary	Gary Sanitary District	Scale pits, oil separators, deep well, sand filtration and chemical treatment	I	63.00	Grand Calumet River - Lake Michigan
Gary Works East (formerly Gary Steel Works) U. S. Steel Corporation Gary	Gary Sanitary District	Scale pits, flue dust thickeners, settling basins and discharge of portion of coke plant wastes to Gary Sanitary District	I	370.00	Grand Calumet River
Gary Works East (formerly National Tube Division) U. S. Steel Corporation Gary	Gary Sanitary District	Scale pits, oil separation and acid collection	A	41.0	Grand Calumet River
Northern Indiana Public Service Co. Mitchell Station Gary	Septic tank - subsurface sand	Fly ash and bottom ash settling ponds	A	440.00	Lake Michigan

APPENDIX II (continued)

Industry	Sewage Disposal	Industrial Waste Facilities	Status	Waste Flow mgd	Receiving Stream
Steiner Tissue Division Georgia-Pacific Corporation Gary	Gary Sanitary District	Clarifiers	A	1.00	Gary sewer
Universal Atlas Cement Company U. S. Steel Corporation Gary	Trickling filter	Oil separation	A	12.00	Lake Michigan
Little Calumet River - Burns Ditch - Lake Michigan					
Bethlehem Steel Corporation Burns Harbor Plant Chesterton	Activated sludge, chlorination and discharge to terminal lagoon	Scale pits, chemical flocculation-clarification units, oil separators, acid neutralization, deep well disposal system, cyanide isolation facilities, water reuse and cyanide treatment	A	130.00	Little Calumet River
American Chemicals Company Griffith	Septic tank - absorption system	Incineration and waste holding lagoon	A	--	Tributary Turkey Creek
Great Lakes Dressing Plant Michigan City	Septic tank - absorption system	Waste absorption pond	A	--	Trail Creek
American Cyanamid Company Michigan City	Septic tank - absorption system	Settling basins and deep well disposal system	A	--	Trail Creek
Northern Indiana Public Service Co. Michigan City	Septic tank - absorption system	Ash settling ponds	A	--	Lake Michigan
Phillips Drill Company Michigan City	Septic tank - absorption system	Oil separator	A	0.025	Trail Creek
Royal Metal Corporation Michigan City	Activated sludge	Ion exchange, settling tank and settling lagoon	A	0.040	Trail Creek

APPENDIX II (continued)

Industry	Sewage Disposal	Industrial Waste Facilities	Status	Waste Flow mgd	Receiving Stream
Midwest Steel Division National Steel Corporation Portage	Activated sludge with chlorination	Cyanide isolation facilities, chemical treatment with clarification and deep well disposal system	A	4.5	Burns Ditch
Vale City Packing Company Valparaiso	Septic tank - absorption system	Septic tank and absorption system	A	0.015	None
Indiana General Corporation Valparaiso	Septic tank - absorption system	Absorption pond and deep well	A	0.030	None
Little Calumet River (West)					
Simmons Company Munster	Hammond Sanitary District	Cyanide destruction and chromium reduction	A	0.150	Little Calumet River
Grand Calumet River (West)					
LaSalle Steel Company Hammond	Hammond Sanitary District	Acid neutralization and clarification	A	0.050	Grand Calumet River and Hammond sewerage system
Wolf Lake					
Lever Brothers Company Hammond	Hammond Sanitary District	In-plant control, air flotation, effluent chlorination and discharge of some waste to Hammond Sanitary District	***	9.7	Wolf Lake

A Adequate
I Inadequate
* Facilities completed being evaluated.
** Are providing advanced waste treatment over and above the requirements of the Federal Conference (Indiana - Illinois).
***Complies with water quality criteria at the control points on Wolf Lake but additional work is needed to improve conditions in Wolf Lake Channel

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APPENDIX III

INDUSTRIAL WASTE TREATMENT AND CONTROL FACILITIES PROJECTS COMPLETED AFTER MARCH, 1970, AND TIMETABLE FOR FUTURE COMPLETION

Industry and Location	Significant Contaminant	Project	Completion Date
Angola Reduction Company Angola	BOD, grease and suspended solids	Anaerobic lagoon system	Completed December 1970
Continental Can Company Elkhart	BOD and suspended solids	Plant Closed 1971	
Pennsylvania New York Central Transportation Company Elkhart	BOD, oil and suspended solids	Oil separator and connection to City sewer (under construction)	Board order established June 1, 1969, completion date. Enforcement of order pending in Circuit Court.
Middlebury Cooperative Creamery, Inc. Middlebury	BOD and suspended solids	Holding pond and spray irrigation system	Completed December 1970
Gentner Packing Company South Bend	BOD and suspended solids	Anaerobic-aerated lagoon (under construction)	Stipulation established December 31, 1970, as completion date
Jeep Corporation, General Products Division, American Motors South Bend	Zinc and phosphate	Chemical treatment and connection to City sewer (under construction)	Stipulation established December 1, 1971, as completion date
U. S. Gypsum Company East Chicago	Suspended Solids	Conversion of wet dust collector to dry dust collection	Completed December 1970

Appendix III (continued)

Industry and Location	Significant Contaminant	Project	Completion Date
Youngstown Sheet & Tube Company East Chicago	Cyanide, oils and suspended solids	Blast Furnace - Sewers, sumps and pumps to collect and recirculate all clarified waste from the blast furnace. No discharge to receiving stream.	Completed September 1970
Youngstown Sheet & Tube Company East Chicago	Oils and suspended solids	North lagoon - A settling lagoon to collect treated wastes from the No. 5 stand of the Tandem Rolling Mill, Sewer No. 23 and the No. 3 Hot Strip Mill. All effluent from the lagoon will be recirculated. No discharge to receiving stream	Completed June 1970
American Oil Company Whiting	BOD, oil, suspended solids and threshold odor substances	Advanced waste treatment for process water	Completed December 1970
Cities Service Oil Company East Chicago	BOD, oil and threshold odor substances	Advanced waste treatment	July 1, 1971
Inland Steel Company East Chicago	Oils, suspended solids and iron	Terminal settling and oil skimming basin	Completed April 1970
Atlantic Richfield Company East Chicago	BOD, oil, suspended solids and threshold odor substances	Advanced waste treatment	Completed December 1970

Appendix III (continued)

Industry and Location	Significant Contaminant	Project	Completion Date
Youngstown Sheet & Tube Company East Chicago	Oils and suspended solids	No. 1 Tin Mill, No. 2 Cold Reduced Sheet Mill - Central water treatment plant for chemical treatment of oils and suspended solids	Completed March 1970
Gary Sheet & Tin Mill U. S. Steel Corporation Gary	Iron, suspended solids and oils	Wastewater from the 80-inch Hot Strip Mill scale pits will be diverted to the expanded 84-inch Hot Strip Mill Filtration Plant	Completed March 1970

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APPENDIX IV
MUNICIPAL TIME SCHEDULE
LAKE MICHIGAN BASIN - INDIANA
LAKE MICHIGAN ENFORCEMENT CONFERENCE
(ILLINOIS - INDIANA - MICHIGAN - WISCONSIN)

Municipality	Facility Required	Employ Engineer	Submit Preliminary	Initiate Final Plans	Submit Final Plans	Arrange Financing	Initiate Construction	Complete Construction and place in Operation
Gary	Phosphorus Removal	x	x	10/1/70	7/1/71	11/1/71	1/1/72	12/31/72
East Chicago	"	x	x	"	"	"	"	"
South Bend	"	x	x	x	"	"	"	"
	Plant Expansion	x	x	x	x	"	"	"
Chesterton	Phosphorus Removal	x	2/1/71	4/1/71	9/1/71	12/1/71	4/1/72	"
Crown Point	"	x	"	"	"	"	"	"
Hobart	"	x	x	"	"	"	"	"
Michigan City	"	x	2/1/71	"	"	"	"	"
Valparaiso	"	x	x	x	x	11/1/71	1/1/72	"
	Plant Expansion	x	x	x	x	"	"	"
Angola	Phosphorus Removal	x	x	4/1/71	9/1/71	12/1/71	4/1/72	"
Goshen	"	x	x	x	x	"	"	"
Lagrange	"	x	2/1/71	4/1/71	9/1/71	"	"	"
Ligonier	"	x	x	x	x	x	x	"
	Plant Expansion	x	x	x	x	x	x	"

Municipality	Facility Required	Employ Engineer	Submit Preliminary	Initiate Final Plans	Submit Final Plans	Arrange Financing	Initiate Construction	Complete Construction and place in Operation
Nappanee	Phosphorus Removal	x	2/1/71	4/1/71	9/1/71	12/1/71	4/1/72	12/31/72
Kendallville	"	x	x	x	x	12/1/70	1/1/71	9/15/71
Elkhart	"	(Included in plant expansion)		x	x	x	x	
	Plant Expansion	x	x	x	x	x	x	(12/31/71)
Hammond (L. Mich.)	Control and Disinfection of Storm Water	x	x	x	x	--	--	12/31/70
Whiting (L. Mich.)	"	x	x	--	--	--	--	12/31/70
Cromwell	Sewers and Sewage Treatment	x	x	4/1/71	9/1/71	12/1/71	1/1/72	12/31/72
Milford Jct.	"	x	x	x	x	"	"	"
Topeka	"	x	x	x	x	"	"	"

x - This step completed.

In addition to the preceding, the following is pertinent:

1. Effluent Disinfection - Ashley, Goshen and South Bend were to provide effluent disinfection by May, 1969. Goshen and South Bend have submitted plans. A Stream Pollution Control Board Order has been issued to South Bend and action on an appeal to the Order is being pursued in Starke County Circuit Court. Enforcement action has been initiated against Ashley and will be initiated against Goshen if construction is not undertaken in the near future on the project which provides for plant improvements, including phosphorus removal, as well as effluent chlorination.

2. Treatment and Disinfection of Storm Water Overflows - The Implementation Plans provide that East Chicago, Gary, Hammond, and Michigan City provide treatment and disinfection of combined sewer and storm water overflows as soon as practicable. These problems are now under study by these municipalities and their consulting engineers. Timetables for this work will be developed after the work scheduled for completion by 12/3/72 is under construction.

3. Advanced Waste Treatment - The Implementation Plans provide that East Chicago, Gary, Hammond, and Michigan City provide advanced waste treatment as soon as practicable and that Angola, Crown Point, Hobart, and Valparaiso provide necessary facilities by 1977. The additional treatment requirements will be evaluated and timetables developed after the completion of phosphorus removal facilities. Hammond is to provide two 1-mgd pilot plants with the project for plant improvements; after studies of the pilot plants are concluded, a project is to be developed for treatment of the total plant flow.

APPENDIX IV
INDUSTRIAL TIME SCHEDULES
LAKE MICHIGAN BASIN - INDIANA
LAKE MICHIGAN ENFORCEMENT CONFERENCE
(ILLINOIS - INDIANA - MICHIGAN - WISCONSIN)

Industry and Location	Employ Engineer	Submit Preliminary	Initiate Final Plans	Submit Final Plans	Arrange Financing	Initiate Construction	Complete Construction and place in Operation
Secondary Treatment or Equivalent							
Inland Steel Company, East Chicago	Completed facilities being evaluated						
U. S. Gypsum Company, East Chicago	X	X	X	X	X	X	(Completed 12/70)
Youngstown Sheet & Tube Company East Chicago	Completed facilities be evaluated						
Continental Can Company, Elkhart	Plant Closed February 27, 1971						
Pennsylvania New York Central Transportation Company, Elkhart	X	X	X	X	X	X	As soon as possible under court action.
*U. S. Steel Corporation, Gary Works Gary	10/1/70	2/1/71	4/1/71	7/1/71	8/1/71	9/1/71	12/31/72
Middlebury Coop Creamery, Middlebury	X	X	X	X	X	X	(Completed 12/70)
General Products Division, American Motors Corp. (formerly Kaiser Jeep) South Bend	X	X	X	3/1/71	4/1/71	5/1/71	12/31/71
Lehman Veal and Poultry Packers Wakarusa	Plant Closed						

X Action completed

* Action on judicial review of Board's order pending

Industrial Time Sch les (continued)

Industry and Location	Employ Engineer	Submit Preliminary	Initiate Final Plans	Submit Final Plans	Arrange Financing	Initiate Construction	Complete Construction and place in Operation
Advanced Waste Treatment							
Atlantic-Richfield Company, East Chicago	X	X	X	X	X	X	(Completed 12/70)
Cities Service Oil Company, East Chicago	X	X	X	X	X	X	7/1/71
American Maize-Products Company Hammond	X	X	5/1/71	9/1/71	10/1/71	12/1/71	12/1/72
American Oil Company, Whiting	X	X	X	X	X	X	(Completed 12/70)

MR. STEIN: Well, let me try to put this together, because I think what we have heard from the States and from Mr. Currie represent both sides of the problem, and we just have to meet this.

Sometimes when we go on the rare dates of the conferences — for example, when we hear explanations from Perry Miller or Ralph Purdy on a particular case, you can get an answer about what a figure means. Or when we heard the analysis from Tom Frangos, you get the answer to what the figure means.

However, there is a lot of impatience, as Mr. Currie points out, with dates apparently being slipped as set up at the conference. I think there are several points we have to make on this. For these dates which certainly have not been revised and set at the beginning of the conference, we went on the assumption that if everyone began to work immediately they could complete the work in accordance with these dates.

We do know that many of these plants did not meet immediately. Also, as Mr. Frangos said, perhaps the reporting has not been the kind that gives us the explanation. But I think there is a problem that we are facing today. Right now, we have a special group in Lake Erie checking on Lake Erie violators, case by case, and if there is an explanation, there is an explanation. But, as Mr. Currie points out, people are not going to wait for it. And we are, on the average, inspecting and evaluating one industry a day on Lake Erie. We are going to get through with that pretty soon, because, as you indicate here, the kind of violators you got, dealing with 62 that are behind schedule, are within reasonable limits, you can get them off.

As soon as we finish there, if the Region is not going to do it with its own resources, I suspect we are going to come up here. But I think the States can expect that we are going to have to send in Federal forces to examine every industry and municipality. When I say "examine" — I don't mean necessarily examine them — every industry and municipality that is behind the conference schedule, and if there isn't a bona fide reason for their being behind, or if pollution can be moved forward by filing a court action or a 180-day notice against them, I am sure Mr. Mayo will make that recommendation. If he makes that recommendation, I want to guarantee you that I am going to act on it, and these cases are going to be moved forward in that manner.

MR. PURDY: Mr. Stein, we have no objection to that sort of procedure. And, again, I am not asking for more frequent sessions of this conference, but this conference has never met in a full reconvened session in Michigan yet. We have one of the largest tributary basins to Lake Michigan — from the total listings of municipalities and industries, I think we have about as many as anyone there. And so far this Federal involvement is a long ways away from our people, and we have had to carry this message back to our people as well as we could. In many instances an appearance before the Water Resources Commission has served to spur on action. I think if the requirements of this conference could be brought closer to some of our recalcitrants that it might have a beneficial effect.

MR. STEIN: Thanks. That is a very nice invitation. I ask the conferees to consider that. I know I and possibly Mr. Mayo and maybe his predecessor, Mr. Poston, when we have been in Michigan on various cases spent some very entertaining times there in Detroit and Grand Rapids.

I am glad to hear we are still welcome in the State. I appreciate those remarks very much.

MR. CURRIE: Mr. Chairman, it seems to me to be appropriate to suggest at this point, after the statement of Mr. Purdy and others, that it would be desirable for each conferee to prepare a full report on the statement of compliance of particular industries for submission to the conferees and, after those reports are in hand, to schedule an additional Conference session which, so far as I am concerned, should be in Michigan, and to determine at that time which polluters we should recommend be prosecuted. I think it is long overdue. I think in addition we ought to meet to reassess the adequacy of the recommendations which have so far been made, particularly in light of the recommendations of the Technical Committee on the Calumet Conference, which has suggested that the existing recommendations for that part of Lake Michigan are, in fact, insufficient to achieve the desired water quality.

MR. STEIN: I think those points are well taken. However, I just have certain authority and perhaps Mr. Mayo does. I thoroughly agree with your last two or three points; Michigan looking at the requirements, checking Lake Calumet, meeting in Michigan, etc.

But, as far as the first one, I think Mr. Mayo and I have been overtaken either by events or executive directors. While we can meet and we would like to ask for your reports and meet again, I think we are under a directive ourselves to get these reports in for possible court action, and I don't know that we are in the position where that can be modified while we wait for the State to report to us.

MR. MAYO: I feel an obligation in terms of the directions I have received to go forward and respond to the directions from Commissioner Dominick. However, I do think that it would be appropriate for the conferees to get together in the near future to review for one another their respective enforcement programs. We could take the opportunity to review the enforcement actions that we have taken in the basin and lay out the full scope of what each of us is doing and how they are or may not be compatible.

MR. STEIN: How soon do you think you could have that report in, if you want to do that?

MR. PURDY: Mr. Stein, I just passed out a report to the conferees. It may not be in sufficient detail to meet all of the needs but --

MR. STEIN: In other words, you think you have this already.

MR. PURDY: No, there would be certainly additional information that is necessary. I often wonder how -- we overcommit ourselves in many ways. Certainly we will try to have it in, say, 4 week's time.

MR. STEIN: All right. Let's see if we can get a report.

By the way, I think this is a very good suggestion of Mr. Purdy's, because if we can get it from the States in 4 week's time, I think we are going to save time in the long run, because we will all be proceeding at least on the same data and I find that the way we can get delays is if you have data that is erroneous.

Now, let's see if that completes the Federal presentation.

Do we have one from Illinois, Mr. Currie?

MR. CURRIE: On the compliance schedules?

MR. STEIN: Yes.

MR. CURRIE: No.

MR. STEIN: Indiana?

MR. MILLER: We passed out one that we prepared on the compliance schedules and the status of the industrial plants and the municipalities in Indiana, and I don't think we would care to read it at this time.

MR. STEIN: Well, I would like to put it in the record as if read. Is that agreeable?

MR. MILLER: That would be fine.

(The above-referred to report may be found at pp. 749-778.)

MR. STEIN: Right. Are there any comments on

Indiana?

Michigan, do you have any comments, Mr. Purdy, on yours?

MR. PURDY: No. We had an opportunity to review the report made by the Federal conferee and I think in general we are in agreement with the figures that have been presented.

MR. STEIN: How about Wisconsin?

MR. FRANGOS: Well, I think, in general, short of some updating, that the report is accurate.

MR. STEIN: All right.

Have you submitted a report here, or do you think the Federal report is pretty accurate?

MR. FRANGOS: Well, we had some working documents which we assumed were going to be submitted by the EPA which I assume were summarized in this report, and we participated in that.

MR. STEIN: Mr. Pratt, are the working documents which were submitted by Wisconsin incorporated in your report?

MR. PRATT: Yes.

MR. CURRIE: And Illinois is in the same position, Mr. Chairman.

MR. PRATT: All of the States submitted

corrections to our document.

MR. MAYO: Excuse me. A point that may not be clear, Mr. Chairman and Mr. Pratt: What was submitted for the record was the summary report, is that correct?

MR. PRATT: Yes.

MR. MAYO: I think it might be appropriate to submit for the record as exhibits the backup material, and then make copies of that material to the extent that they may not already be available for the conferees.

MR. STEIN: Do you have that?

MR. PRATT: Yes.

MR. STEIN: All right. Let's take that as an exhibit without objection. That concludes that.

(The above-mentioned exhibit will be on file at Headquarters EPA in Washington, D.C. and Region V office of the Environmental Protection Agency, Chicago, Illinois.)

MR. STEIN: Now, I think we have been over this. I would like to split the next item in two parts because I think while they are put together they are just put together for literary convenience, and I think we have quite different problems.

One, the discussion of the phosphorus problem. Let me state this as I have heard the problem. The problem is this: We have come up with a plan for 80 percent reduction in municipal and industrial phosphate discharges, 80 percent to be computed on a Statewide basis, into the Lake Michigan Basin. This program is going forward. There is some concern that we did not take into full account the phosphates coming from the land or from storm runoff and we may not have a tight enough phosphate control program.

Now, I think if -- I think if we have to change direction on this program, we should consider this, and I welcome comments from the conferees.

MR. MILLER: Mr. Chairman, of course, working from some of the information that Mr. Dumelle submitted on this problem, I think that we in Indiana have several years of data where we have been sampling the mouth of the tributaries, which would get the phosphates both from runoff and from municipal water treatment plants.

And contrary to the data that he had or has included in his letter -- not his data -- we would find that the data that we have would be about one-fifth of the values that were used at arriving at the 80 percent reduction. So wherein I believe he said that they were low by a factor of 7, we would find that our values are beneath him by a factor of 35.

So that we do not find that in a very small percentage of the basin we have -- which is roughly 5 percent --

that the phorphorus problem, if it were uniformly divided — and I am sure it is not — throughout the entire basin, is such that it would be as much as was used in the figures for predicating the treatment that we based the needs upon.

MR. STEIN: Any other comments?

MR. DUMELLE: Mr. Stein and Mr. Miller, you will recall that in October I presented a kind of paper and pencil study comparing Lake Erie with Lake Michigan, and there were some factors of 12 times as much, and so forth, and to omit a lot of stuff in between, Michael Schmidt has come in with a paper based on Federal data and shows 15 million pounds of phosphates going into Lake Michigan. I don't have all of his backup sheets; I don't have the St. Joseph River sheet. I know the Federal people have looked at it because they have had it for 2 months, and really all I am asking is the thing that you said, Mr. Chairman, in October — that this would be referred to the Technical Committee for study. I am not prepared to say which is the correct number, but I think we have tributary monitoring around the basin, and we can do as Mike Schmidt did and take the 1970 data now and put them together and come up with a report for the next session of the Conference and see what the facts are.

MR. STEIN: Well, I think, Mr. Dumelle, at least

I agree with what you said.

Let me check this out. Do we have an appropriate technical committee to handle that?

MR. MAYO: To my knowledge, there has not been one established.

MR. STEIN: Here is what I think. I think, Mr. Dumelle, you have raised what I think are some very interesting points and certainly pointed at a problem that has to be looked at.

On the same point, I think we have to consider with care the kind of comments we got from Mr. Miller on what the situation is in Indiana, as an example.

Now, if the conferees think this warrants it, if we have not mounted a phosphate program on this municipal and industrial waste reduction program that is going to handle the phosphate program — and I think Mr. Dumelle's initial analysis in the case there may be some significant doubts about this — we had better examine this and come up with certain specifics.

Again, like all of these programs that emerge, you get a general identification, but unless we have real specifics, we can't deal with it.

Now, do you think it would be worthwhile for us to establish a group to deal with the question of phosphates. We ought to keep open, however, as we proceed with our discussion this afternoon, the desirability of that same group looking at a chlorides question. And, as I recalled some of the comments that Mr. Vaughn made this morning — I am trying to find out where it is covered in his report — he spoke to the concentrations of dissolved solids increasing at a rate faster than had been projected. So it may be that what we have here is an appropriate package of parameters that a technical committee could address itself to and make advantageous use of their time in looking at phosphates, chlorides, and total dissolved solids. I just offer that as an observation as we proceed. Certainly they could at least address themselves to the phosphorus issue.

MR. MILLER: Mr. Chairman.

MR. STEIN: Yes.

MR. MILLER: I have a little problem in this area in that I don't know what data is available from the various States. As I indicated, we in Indiana, I think, on the phosphorus problem and I think also pretty much on the chloride problem, can give you the loadings from Indiana.

Now, it would seem that if this can be done by all of the States of the Lake Michigan Basin, the first thing that we should have should be an assessment of these data, and a compilation of them, so that the conferees could review it. It would seem that this is almost fundamental if we are going to have a technical committee work on it.

MR. STEIN: Right. But I don't know whether you want to do this with a technical committee or assign the job. You are saying, before the technical committee works, they are going to have to get some data from the States pulled together and presented to them. Is that what you are saying?

MR. MILLER: I am saying I think — correct —

MR. STEIN: By the way, this same situation may be the case with chlorides, too. I don't know. Do we have this disparity in data, or do we pretty much know the point sources we expect in chlorides? Don't we? Or do we?

MR. DUMELLE: I would say, in general, yes.

MR. STEIN: In other words, you know where to look, Mr. Dumelle, for the chlorides in more particularity than the phosphates.

MR. DUMELLE: Yes. I think — and I don't know how many of you have had time to look at it — but Dr. Ayers put out a recent report called "The Lake Michigan Environmental Survey," which we got about a month ago, and in the back he has his loading data which I have never seen before updated for the lake. But curiously enough he shows that the flow out through the Straits is cleaning out the lake, which shows really, you know, that the input data is probably too low, and he makes the point that there are no data for direct dischargers, and many others.

So I think this committee that we are talking about could eventually go perhaps through all those loads, but I would say phosphate would be the most important first and whatever else the conferees would want.

MR. STEIN: Let me raise a question with you, and I don't want to divert too much.

But if we made certain requirements, or proposed certain requirements, at least on the new plants, I think this was unanimous.

I understand the addition of heat to the lake, which we all admit is transient and we are going to leave it there for awhile, but when you have a freshwater lake, what is the problem in just saying they can't put in chlorides above certain concentrations?

I find it difficult to believe that in tackling a big thing with powerplants that the government seems to be afraid to tackle something like chlorides, or why we have to go through this.

Is there a limitation that the conferees can consider pretty soon on what limitations we should require, just as in good housekeeping for a clean lake like Lake Michigan, and say that, darn it, no industry, no city is going to put more chlorides in or dump them in the lake?

Now, what -- do we need a committee to examine where it comes from? You know my business is evidence, and chlorides are the easiest thing for us to trace. If I have to send a crew out to find anything — maybe there is one easier thing, radioactivity or these dyes — but other than that, salts, chlorides are like rolling off a log; you know where they come from.

MR. CURRIE: Exactly right, Mr. Chairman, and I think what we need in the case of chlorides is not the kind of study to determine the sources and the loadings that we need in the phosphate situation, but a specific recommendation as to what deadlines and what requirements this conference should impose.

MR. PURDY: Mr. Stein, may I read a statement with respect to the status of the chloride reduction program in the Lake Michigan Basin?

MR. STEIN: Yes.

MR. PURDY: The Michigan salt and brine industries has been estimated by the staff of the Water Resources

Commission to contribute 50 to 60 percent of the average daily chloride contribution to surface waters in the total Lake Michigan Basin, and this estimation, of course, had to be made in the absence of specific information from the other three States.

The Commission has notified the five companies involved that discharge of concentrated chloride solutions cannot be continued and that appropriate corrective programs must be developed.

At its January 21, 1971, meeting, the Commission held conferences with the Manistee area salt brine industries, Hardy Salt Company, Morton Salt Company, Morton Chemical Company, and Standard Lime and Refractories Company, at which time the industries indicated that programs have been initiated that would affect chloride ion reductions of 75 to 80 percent.

Stipulations formalizing the programs have been entered into with Hardy Salt Company, Morton Salt Company, and the Morton Chemical Company. Staff have recently reviewed program proposals from Standard Lime and Refractories Company and the Dow Chemical Company Ludington plant. These are presently under review by staff. And I would be most happy to make the details of this available to all of the conferees.

What is more, I am abundantly aware of the permit program required under the Refuse Act, and at such time as we are required to certify under 21 (b) the permit applications of these industries, we intend to include as a condition in that certification the requirements that the Commission had established and the time schedules that they have established for this reduction.

MR. STEIN: Do these reductions meet the standards? Do we have a standard for these chlorides?

MR. PURDY: Well, from the standpoint of, say, an effluent standard, we, of course — of course, effluent standards have not been established as a part of the standards program. From the standpoint of an injury to fish and aquatic life, I do not believe that the present discharges are causing an injury to fish and aquatic life.

I do not believe that the chloride discharges are injuriously affecting water supplies or public health in the concentrations that we find them in the receiving waters and the purposes for which those receiving waters are used.

Now, as stated either yesterday or the day before, the Michigan Water Resources Commission does not believe that this represents a wise use of the resource -- either the salt brine or the freshwaters, and that action was necessary to bring about an early reduction, and we are on that sort of a program.

MR. STEIN: Well, do you know what the reaction of the other States to the program are, Mr. Purdy? Well, to the kind of reduction -- now, let me cut this -- go off the record right here.

(Discussion off the record.)

MR. STEIN: I think that we are probably closer to a solution or a proposal for consideration of the conferees on the chloride problem than we are possibly to a solution of the phosphate problem.

Now, I think what we have to do is get to the conferees, if we can -- and we have this from Michigan now -- identifiable chloride sources that you believe are significant; that we will exchange this information with all of the States, and if anyone believes that the States are not proceeding with a reasonable program, we should bring this up. And also if we were going to have the next session of the Conference, we should be able to come up with a proposal for control of chlorides, which should be applicable to all sources going into Lake Michigan.

Is this reasonable, without setting up a real data-gathering operation? I think we should be prepared to do that.

MR. CURRIE: I agree, Mr. Chairman.

MR. PURDY: Mr. Stein, I can't help but point out from the standpoint of chlorides as a whole into Lake Michigan, and the input into Lake Michigan, that for those instances where we use a ferric chloride salt for the removal of phosphates, that we are in fact going to be adding new sources of chloride to Lake Michigan.

MR. STEIN: That may be true.

By the way, as I pointed out, I think that is a problem, dealing with phosphates. Dealing with the chlorides and the salts associated with phosphates is probably going to be a more difficult problem to get at.

Let us put it this way: I think -- is it fair to say that the point sources of salts we are all talking about are in Michigan? Do you have any in Wisconsin?

MR. FRANGOS: No.

MR. STEIN: They are all in Michigan.

MR. MAYO: That is from industrial discharges.

MR. STEIN: Yes, that is what we are really talking in terms of, and that is the crucial point, and from the citizens testimony, these are the sources we are talking about.

MR. PURDY: Do we not have some large chloride sources from steel mills, where they use hydrochloric acid for pickling purposes?

MR. STEIN: Yes, you do.

MR. PURDY: Well, is that not a chloride?

MR. STEIN: Sure is.

Now, I am suggesting, sir, that since we deal with this, you get your program to the Federal people, and at the next session Michigan present its program. Hopefully this will dovetail with the Federal recommendations. So we can deal with the chloride program, the Federal people will come up with a recommendation on chlorides that will deal with these industrial sources, steel mills, and municipal sources as well if you feel it is significant.

In other words, let me repeat, it will be the Federal responsibility to come up with a recommendation on chloride control.

It should make a careful analysis of the Michigan program, and consult with the other States relating to controls of chlorides. Really, gentlemen, I don't think this should be a very difficult task.

MR. MAYO: Just by way of information, Mr. Chairman, I think it would be appropriate to put in the record, at this time, some observations on the differences in the Water Quality Standards relating to chlorides in Lake Michigan. And I think it would be appropriate in this interim period for the States to address themselves or at least be aware of those differences and to keep in mind the thought that it might be desirable for a considerable amount of more uniformity than we have at the present time.

The Illinois and Indiana standards -- just to summarize it -- provide for an annual average not to exceed a graduated scale which went from 8 milligrams per liter in 1965 to 12 milligrams per liter in the year 2000.

The Michigan standard is a monthly average not more than 50 milligrams per liter with 10 milligrams per liter as desirable.

Wisconsin doesn't have a specific criterion for chlorides and the existing water quality in Lake Michigan -- on a quick summary of the data that is available -- is on an average 8.5 milligrams per liter, with a maximum, at some points in the lake, in the range of 11 milligrams per liter.

So we have a fair range in difference in terms of the maximum permitted, and two sets of standards that provide for a programmed increase in chlorides with time. So as we proceed with this, I think we will draw this matter to the attention of the States.

MR. FRANGOS: Mr. Mayo, I was just wondering, as long as we are making observations here, would you want to make an observation of how that came about?

MR. MAYO: I would have to say these standards were approved, and I think we need to collectively address ourselves to it.

In fact, I think it would be a good idea for the Regional Office of EPA to provide you with a working draft of a resume of Water Quality Standards by parameter, by State, with some relationship to average and maximum water quality conditions in the lake.

We will get this out to you. I think it would be very informative.

MR. PURDY: Mr. Stein.

MR. STEIN: Yes.

MR. PURDY: I really don't interpret our standards with that much leeway, and I think the only way one can interpret it in that fashion is to disregard the antidegradation statements, and it was my understanding that the antidegradation statement was to serve this very purpose. And I consider this to be a real statement, and therefore as such it does not mean that it provides for increasing amounts to go into Lake Michigan from Michigan sources.

Discussion on Chlorides

MR. STEIN: Well, I appreciate that. I know you people were not at St. Louis at our meetings on the temperature standards of the Mississippi River States, I know for a very pressing reason. But we had precisely the same problem. You know, Mr. Frangos, this may be a little unfair to ask Mr. Mayo, the Regional Director, because one of the responsibilities I also have now are these standards. The way they are developed on a State-by-State basis without getting the States together, we find that in many areas you have disparities such as we have found here.

From the chlorides we have heard and the standards, for example, and the explanation given by Mr. Purdy, I suspect that the standards while expressed differently, in fact are not that much different and can be brought together. In the entire Mississippi River, I think we just had from top to bottom a spread of a difference maybe of less than 5° on these maximums. Of course, they were very vexing to put together once you got set.

But I think we are in the ballpark, and I would ask the Federal conferee to try to get together and see if we can't come up with a recommendation that we can all go forward with on chlorides.

Discussion on Phosphorus

Now, on phosphates, I think maybe we can have an alternate of the same procedure. I suspect what Mr. Miller said is probably entirely correct — that before any group can get together you should be able to get the data and evaluate the material that each State has and how it considers its problem on phosphates.

Then, once that is assembled, as I understand the proposal, it would be productive for the Federal Government to get in contact with the States, and set up a group, and make a determination whether we have an effective phosphate program in existence or have to revise it.

If we have to revise it, there are two things, 1) either we are going to know enough to make the recommendations for revision, or 2) we are going to have to do some further work or some data-gathering before we can come up with the answers. By the next conference we should turn in the recommendations.

MR. MAYO: Well, I would have to know what you are thinking of in terms of the estimated date of the next conference, Mr. Chairman, because as you know our resources aren't limitless either.

MR. STEIN: No. We haven't set the date, but I think we should start working on the project.

MR. MAYO: Yes.

Discussion on Phosphorus

MR. STEIN: Now, even though you don't have the next Conference date -- and Mr. Purdy has invited us to Michigan; that is lovely in the summer -- the fact is we are going to have to do this one way or the other. I think we just have to get started on it to evaluate this situation.

MR. FRANGOS: Now --

MR. STEIN: Yes.

MR. FRANGOS: -- I would view the phosphorus question as one that is of high priority for a couple of reasons. I think that indeed if Mr. Dumelle's figures are anywhere near correct that we do have a lot more to do, but beyond that -- and I would say that our estimates are considerably lower than his, but they do raise another question.

I think if indeed his figures are anywhere near what is really happening, then I think it also raises a question about phosphorus removal at sewage treatment plants. Because if the ratio of input is not indeed what we estimate it to be between municipal and agricultural sources, and if we are talking about taking phosphorus out of the box, then I think we have got to look very closely at these requirements before providing phosphorus removal because of what we are getting for our dollar that we are investing. I raise that question because that question is being asked of me by our communities.

MR. STEIN: I think that was implicit, and it seems to me -- in what Mr. Dumelle raised -- that he raised some very vital and pertinent questions. But what I am saying is this: I think you have made the same kind of rejoinder as Mr. Miller. If we are operating on the basis of some figures made by Mr. Dumelle, and then we have great variances on these assumptions made by Indiana, and perhaps we have heard from Wisconsin now, what I think we have to do is get the Federal people together and pull this together with Mr. Dumelle and all of the States, and if those assumptions or figures still stand up we know we have a problem. If the estimates are way too high -- no one has any way of knowing this -- and you can scale this down, maybe we don't have a high priority problem.

What I am suggesting is with all of the work we have to do before we go into high gear, and even to make this a meaningful study, even if we do go into high gear, we are going to have to assemble the facts and get the assumptions correct first, That is what I think we should do and send a man around to the States and send them pretty quickly to get this and feed this back to all of the States so we know where we are.

Discussion on Phosphorus

MR. PURDY: Mr. Stein, again, I think we may possibly know where we are a little bit more than might have been indicated, and I certainly would not like to give the, say, roughly 33 Michigan communities, that are less than 1 year behind schedule any comfort. I think we need to press forward on this phosphorus removal program at point sources as quickly as possible, because I do think they represent a significant contribution -- contribution of readily available phosphorus to the lake.

Michigan State University has a rather detailed study on the Grand River, a large tributary to the Lake Michigan Basin. I think this detailed study, yet in unpublished form, will show the dangers of trying to generalize where you can go into small tributaries on the basin and find that a large percentage of that small tributary might be from land runoff; that from the basin as a whole the figures indicated that some 55 percent of the total phosphorus input into Lake Michigan is from point sources and roughly 45 percent from land runoff.

MR. STEIN: By the way, I don't think that has been disputed, and I think that that was the basis of our setting up the phosphate program in the first place.

MR. MILLER: That is right.

MR. STEIN: I don't think this was lightly undertaken when we put this requirement on our major cities. It is costing a lot of money, and the reason that the States decided to go with this program and we did is that we were all convinced that it would work, and nothing has — as far as I can see that has come up — has changed our thinking on that.

The point is this though — the question is maybe we have not gone far enough, and there may be additional things that we have to do if we are going to lick the phosphate problem in the lake.

MR. PURDY: In that context, I agree.

MR. STEIN: Okay. So let us start with that. This about completes the agenda.

Does anyone have anything else?

MR. MAYO: Just the observation, Mr. Chairman, that when we reach the point where the number of the people at the head table equals or exceeds the number of the people in the audience, it's a sign.

MR. STEIN: I know it's a sign. I learned something from you again, Mr. Mayo, at this one. There is one phrase you used, boy, I am going to cherish for awhile. For a big merchandising part of the country — you see that is where we make the money — and when you said that we were going to send the States a "package of parameters," I figured we had something.

MR. MILLER: Mr. Chairman, I might just raise a question. In the findings that were passed out, they do not include those that were made by Mr. Purdy. Will there be a supplement to these?

MR. STEIN: Was that just an oversight?

MR. MAYO: Yes.

MR. STEIN: That was just an oversight. It will be corrected.

MR. PURDY: Thank you.

MR. STEIN: Are there any questions?

You know by the time we got to the end of the New Testament they kind of forgot to produce the old one.

FROM THE FLOOR: Amen.

MR. STEIN: Are we ready to stand adjourned?

Does anyone have anything to say?

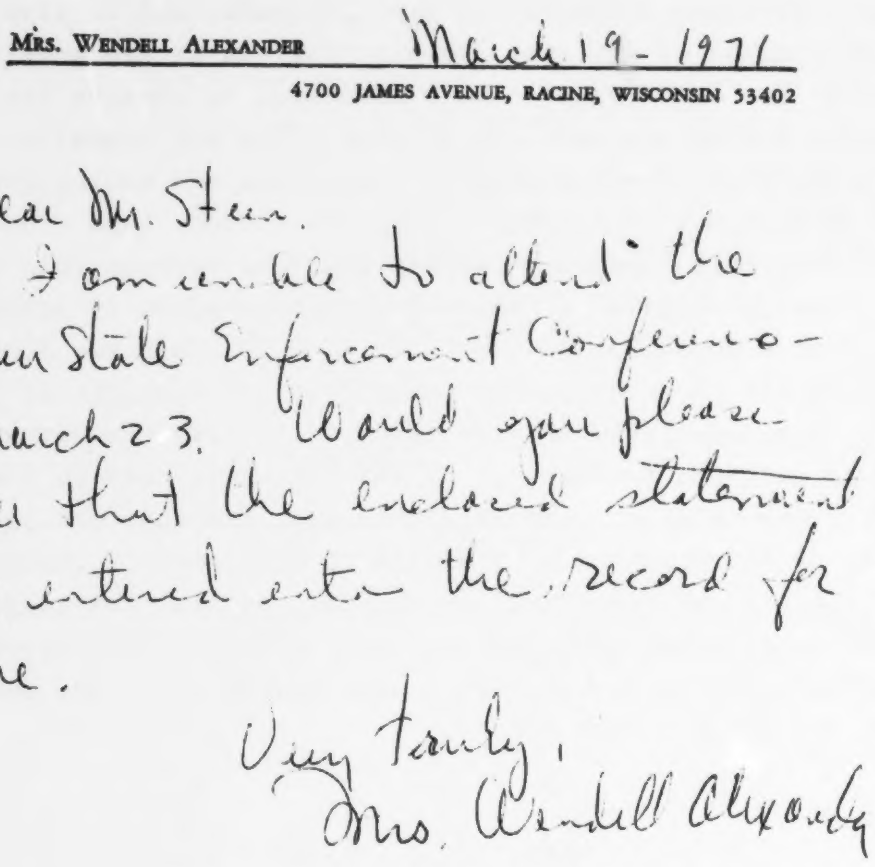
By the way, I think this has been exhausting, but it has been productive, and I think we are on our way, and let me make one last observation -- and I ask you to bear with me.

It is very easy, in a sense, in a conceptual sense, to hit the gross municipal and industrial pollution that we hit at the beginning of these cases and the beginning of the Conferences, and when you start a cleanup. But once you get beyond that, and you come to these more subtle effects and the things that we don't know too much about and are not as obvious, I think there is no substitute to, in a sense, what we have gone through here, to try to work our way toward conclusions and determinations when we have such a divergence of opinion — that, and maintaining our democracy, and maintaining our sanity, and maintaining due process means taking up a lot of time.

Thank you for staying with us, and we stand adjourned.

(Whereupon, the Conference adjourned at 5:25 p.m.)

- - -



MRS. WENDELL ALEXANDER
4700 JAMES AVENUE, RACINE, WISCONSIN 53402

March 19 - 1971

Dear Mr. Stein.

I am unable to attend the Four State Enforcement Conference - March 23. Would you please see that the enclosed statement is entered into the record for me.

Very truly,

Mrs. Wendell Alexander

Statement for the Four State Enforcement Conference on Lake Michigan
March 23, 1971, Chicago Illinois

ubmitted by Mrs. Wendell Alexander, 4700 James Ave. ,Racine, Wis. 534o2

Every one agrees that Lake Michigan is one of the greatest assets f this area. It means much to many people. My husband and I have wned Lake Michigan property for over 20 years, and we live within sight and earshot of the lake. We love it, and we are worried about its future. You don't have to be a scientist to observe the changes in the lake during the last two decades. They are dramatic. However, the preponderance of evidence from biologists and ecologists indicates that unless we reverse the present trend, Lake Michigan will suffer irreparable damage. Then, why don't we reverse this trend?

I followed with great dismay the arguments given by industry at the conference September 28 - October 2, 1970. Such as: discharges of heat are not necessarily detrimental to the ecology; if proven to be so, measures could then be taken to rectify the situation. Such statements are reminiscent of the arguments used by the tobacco industry concerning lung cancer, years ago. And they are just about as valid. By the time industry admits to enviremental damage, it will be too late.We cannot afford to wait and see. The longer we wait, the more damage done, and the more difficult and expensive the cure. We must do ALL we can now. I urge you to adopt the one degree standard on thermal pollution.

Mrs. Wendell Alexander

STATE OF ILLINOIS
POLLUTION CONTROL BOARD
189 WEST MADISON STREET SUITE 900
CHICAGO, ILLINOIS 60602

DAVID P. CURRIE, CHAIRMAN
SAMUEL R. ALDRICH
JACOB D. DUMELLE
RICHARD J. KISSEL
SAMUEL T. LAWTON, JR.

TELEPHONE
312-793-3620

April 7, 1971

Mr. Murray Stein
Assistant Commissioner
Environmental Protection Agency
Water Quality Office
Washington, D.C. 20242

Dear Mr. Stein:

In response to your invitation to keep the record of the Lake Michigan Enforcement Conference open for two weeks, I ask that this explanation of my position as Illinois Conferee with respect to thermal standards be transcribed in the record of Thursday, March 25.

Illinois has conducted extensive hearings on this subject and forwarded detailed fact findings, together with a position statement, to the other Conferees in advance of the March 22 session. Virtually all of our findings were adopted by the Conference, yet our position on the merits was not adopted. This statement will further explain our position.

I disagree with the proposal of the Technical Committee because what the Committee proposed was a non-decision: to put off the decision whether or not to require alternatives to once-through cooling until a date to be set by the Conference. I think such a proposal is based upon the vain hope that with a little more research we will be able to quantify the harm to the Lake from once-through cooling. I think it quite likely that five years from now we shall have a good many more studies but not much better an idea about the harm to be expected from once-through cooling. I think we know enough to draw a firm line today, and I think we should settle the controversy now for the benefit of everybody concerned.

I agree with the latest federal proposal in what I consider its most important aspect: that no new power plants beyond those now under construction shall utilize Lake Michigan water for once-through cooling. I agree, as Dr. Mount said, and as the original federal white paper established, that the proliferation of power plants poses a serious threat to the Lake. Moreover, I agree with Dr. Mount's argument that we will never know just which power plant it is--whether the twentieth or the fiftieth--that pushes the lake beyond the danger point. I agree that if we wait until we can prove that a proposed power plant will do more harm than good before forbidding once-through cooling we may very well make up without a lake to save one of these fine days. It therefore seems to me the only safe course of action is to tell the power companies today that they should look elsewhere for free cooling water and not clutter the shores of Lake Michigan, which have other important uses, with any additional power plants.

I therefore applaud the federal government for its firm stand in principle against proliferation of power plants on the Lake, and I support that part of the federal position heartily. Illinois intends to outlaw proliferation; I hope the apparent acquiescence of the other states in the new federal proposal indicates that they will do so as well.

But I disagree with the federal proposal to require cooling towers on plants now under construction. The cost of doing so is quite considerable; Dr. Tichenor estimated it at from twenty to forty million dollars for the Zion plant alone. It is possible to make this figure sound insignificant by calling it twenty-five cents, or ten cents, per residential customer per month; I would cheerfully impose such a cost on the consumer if I thought there would be a benefit from doing so that is somewhere in the same ballpark. But twenty million dollars is a lot of money to spend even if it is collected from a great number of people, and it should not be spent without justification.

I have seen no evidence that a single plant such as Zion will cause such a degree of damage to the Lake as to justify the expenditure of that kind of money. Dr. Mount emphasized the other day that what we are all worried about is the effects of a number of power plants, not of one. The nine days of evidence I have heard convince me, as I said in my letters of February 2 and March 3 to Mr. Stein, that the damage we are confronting is the exclusion of fish from a handful of acres at the point of discharge and the killing of a number of microorganisms drawn through the condensers. I should of course prefer not to have this damage occur. But I believe that the effects of one plant will be both local and minor. Moreover, I do not believe it desirable to foster the construction of large and unsightly cooling towers on the lakefront. Lakefront property ought to be kept for recreational uses. And there are blowdown problems with cooling towers that risk the discharge of pollutants other than heat to the Lake. I am unconfortable when I read, in the statement by the Porter County Izaak Walton League, that "evaporative cooling towers will prove to be extremely objectionable and will have to be abandoned within a few years of first operation." I think this overstates the problem; but I do think it not entirely clear that cooling towers on the lake are much better for the environment, under the present circumstances, than once-through cooling. When all these things are considered, I do not think we should require today the backfitting of cooling towers or other devices on plants now under construction. But I do believe the situation should be carefully watched and corrective action taken if at any time significant harm to the lake is shown.

I think the best argument in favor of backfitting is the one I have used above in justifying an absolute ban on once-through cooling in future plants, namely, that the line must be firmly drawn at the outset. But I see no reason why we must draw the line in such a way as to impose the added costs of backfitting, especially if the federal proposal is to be read as requiring that the operation of plants must be delayed while cooling towers are installed. Let us draw the line today to avoid the excessive costs of backfitting and to end the threat of proliferation.

I have serious doubts about the water quality standard proposed for existing plants in paragraph A of the federal proposal. I believe it is likely to require expensive modifications to old plants that in my opinion cannot be shown to have sufficient adverse effect on the lake to justify the cost. I question whether a mixing zone should be defined in terms of the greatest linear dimension, since this makes the legality of a discharge depend on winds and currents rather than on the area of the lake affected. I am disturbed by the ambiguity in the definition of the mixing zone, as to the location of the "fixed point" from which the 1000' measurement is to be made. I should like to know more about the impact of the monthly maxima on existing plants, specifically whether we must require cooling towers as well as intake and discharge modifications to plants like Waukegan.

In short I think there remain technical difficulties with the present federal proposal, as well as important questions of policy. I think too much money will have to be spent under that proposal to deal with what I believe is an insignificant problem. What we are all worried about is proliferation. Let us deal with proliferation. Let's forget about the few existing plants until someone shows they're doing more harm than we now suspect they are. On the present record I think they're not worth the cost.

Finally I should like to say that I think overall the federal proposal is a substantial step forward; it does give us substantial protection against proliferation, and that is to me more important than the question of what happens to existing plants and to those under construction. I wish, however, that the federal government and this Conference would give half so much attention and half such agressive energy to the solution of other pollution problems which I believe to be far more important, such as the continuing discharge of phosphates, oil, cyanides, ammonia, and inadequately treated sewage. We have been diverted from these critical questions for over a year while we fiddle about thermal pollution. I think the federal government exhibits an extraordinary system of priorities in insisting on backfitting thermal sources in Lake Michigan to avoid speculative harm while backing down on the rudiments of decent sewage treatment on the Mississippi River and while doing nothing about enormous chloride discharges to the Lake.

Please make this letter a part of the record.

Sincerely,

David P. Currie

David P. Currie
Chairman

DPC:jc

ON THE WING MILWAUKEE AUDUBON SOCIETY
A Branch of the National Audubon Society

Policy Statement, March 17,1971

We wish to make clear our stand on the discharging of heated water into the lakes and rivers by power plants.

It is a well-known fact the demand for more and more electrical power hes been increasing. To supply that demand , greater power sources are needed. This has lead to the building of more power plants, including the nuclear power complexes.

We are not opposed to power plants as such -- nuclear or otherwise. We ARE opposed to the discharge of superheated water into our lakes and rivers, because we are not satisfied that sufficient evidence of the ecological impact of such action has been obtained. We are convinced that it is foolhardy to gamble with the long-range welfare of man and his environment for the sake of an immediate and perhaps only too short lived gain.

We therefore stand firmly beside those who urge further honest, diligent study NOW, so that when we go on to build , our progress may be truly beneficial.

Sister Frances Wagner
Sister Frances Wagner
Secretary, Milwaukee Audubon Society

(The following statement was prepared for presentation to this Session of the Lake Michigan Enforcement Conference but because of time limitations was not read:)

POLLUTION FROM AGRICULTURE AND OTHER LAND-USE ACTIVITIES

By

Will C. LaVeille
U. S. Environmental Protection Agency
Water Quality Office, Region V
Chicago, Illinois

POLLUTION FROM AGRICULTURE AND OTHER LAND-USE ACTIVITIES

Pollution from land-use activities is a serious problem in the Lake Michigan basin, leading to over-enrichment and possible ultimate death of the lake itself and of the tributaries to it. Livestock operations consisting mainly of dairy farms and small beef cattle and hog raising units predominate in the region; poultry and sheep are also raised, but in smaller numbers. Changes in the cost of operation and in general farming technology, however, are making larger livestock operations more profitable and are causing an increase in the number of large beef cattle feedlots. The accumulated animal wastes from these operations are causing a new environmental problem, although one which can be controlled relatively easily because of the approximately point-source origin of these materials.

The change in agricultural technology, e.g., the raising of mono-crops and the switch to high-yield plant varieties, has also resulted in a greater dependence upon chemicals. Heavy applications of pesticides in fruit orchards and on certain field crops throughout the basin presents a high potential for pollution from runoff. Similarly, fertilizers and nutrient materials can reach the waterways through the erosion process and can cause eutrophication of the waters. Indeed, the over-shadowing problem regarding pollution from agricultural and other land-use operations seems to be soil erosion, which of itself causes siltation, a serious problem related to all land-use activities.

By controlling soil erosion it seems probable that upwards of 90% of the agriculturally related pollutants could be prevented from reaching the surface waters. Animal wastes could be confined to the land by the same techniques used to keep out soil particles. Pesticides and fertilizers could similarly be prevented access to the waters by erosion control measures. And the polluting nature of soil particles themselves could be prevented by proper land management techniques.

The existing soil erosion abatement programs of the U.S. Department of Agriculture are not effective enough. It has been estimated that the total soil erosion is 25% less than it would be without these measures, but in general, and definitely in localized areas, the problem continues to be very serious. Educational programs carried out by the Extension Service (ES) and the Soil Conservation Service (SCS) have only been slightly effective in reducing pollution. The newly approved pollution abatement practices of the Agricultural Stabilization and Conservation Service (ASCS) are only a halting step toward an effective program. In general, the U.S. Department of Agriculture has not made pollution reduction a major concern and therefore agricultural pollution continues for the most part, unchecked. Additionally, State plans for pollution abatement are in general poor and do not properly address the problem.

In the area of on-going control programs, pesticide regulations of one form or another seem to exist in all States; specific details of the four Lake Michigan States are as follows:

ILLINOIS:

The State of Illinois has a Customs Spray Law effective since January 1, 1965. To obtain a license, the applicant by examination, shows that he possesses adequate knowledge concerning proper use and application of pesticides, the dangers involved, and the precautions to be taken in connection with their application.

All pesticides sold in Illinois must be registered with the Illinois Department of Agriculture before they can be legally sold in the State.

The use of DDT was prohibited on January 1, 1970, except where a permit is obtained from the Director, Illinois Department of Agriculture.

INDIANA:

Indiana has had a Herbicide Law since January 1, 1961. It places restrictions on the sale and use of herbicides by requiring registration with the State.

It has no general pesticide law at the present time, but expects to have one passed this spring by the legislature.

MICHIGAN:

Michigan has had an Economic Poison Law since 1949, amended in 1961 and 1964. It regulates the sale and use of pesticides by requiring registration with the State Department of Agriculture.

The Michigan Department of Agriculture sent a Notice to Manufacturers, Distributors, and Registrants of Economic Poisons on April 28, 1969, that it was concelling the registration of DDT, 60 days from the receipt of that notice.

Another notice was sent on June 30, 1970, that all arsenicals for the purpose of debarking trees and as an aquatic herbicide were to be denied registration effective November 1, 1970.

WISCONSIN:

Wisconsin has a Pesticide Law regulating the sale and use of pesticides by requiring registration with the Wisconsin Department of Agriculture.

On July 25, 1970, the distribution and sale of DDT was prohibited.

On November 1, 1970, new rules adopted by the Wisconsin Department of Agriculture on pesticide use and control went into effect. It prohibits the registration, possession, sale or use except for research and experimental purposes. or emergency use under permit, three pesticides:

DDT
DDD (TDE)
Endrin

It restricts the registration, sale and use only for purposes specified, the following pesticides:

Aldrin
Benzene Hexachloride
Dieldrin
Heptachlor
Lindane
Alkyl Mercury Products

Most of the State Economic Poison Laws are modeled after the Federal Insecticide, Fungicide, and Rodenticide Act, which the Pesticides Regulation Division, EPA, currently enforces. The Economic Poison Laws regulate the sale and use of pesticides by requiring registration. In order to register a pesticide, the applicant must furnish efficacy and toxicity data for the active ingredients in the pesticide. The label must also have adequate warnings and directions for use to protect the environment.

In the past, the applications were reviewed by the Departments of Agriculture, Interior and Health, Education and Welfare.

As indicated above, the States do not have mutually uniform restrictions and regulations. It is suggested that this be achieved by empowering the existing five-State Governor's Interdisciplinary Pesticide Committee (Illinois, Indiana, Michigan, Minnesota, and Wisconsin) to draw up measures for unifying the lists of permitted, restricted, and prohibited materials. As an additional step in the control of these agricultural chemicals, it is suggested that the States adopt a program of accounting whereby the pesticide user must sign for each quantity of pesticide and specify the area it is to be applied on. Thus application rates over the recommended level or at the wrong time of the year (rainy season) could be detected and controlled.

The handling of animal waste problems is not governed, at the present time, by administrative codes, regulations, or water pollution control guidelines by any of the four Lake Michigan States. However, Illinois and Wisconsin have initiated the drawing up of such documents. The Illinois Environmental Protection Agency has (in its second or third draft now) proposed a registration program, coupled with suggested design parameters, for the reduction of pollution from animal wastes. Similarly, the Wisconsin Department of Natural Resources has formed an ad hoc committee to suggest an administrative code for the management of animal wastes. Both of these States felt it advisable to formulate such a program to regulate the development of new livestock operations, the enlargement of existing operations, and the control of pollution from improperly managed existing dairy, beef, swine, sheep, or poultry facilities. It is strongly suggested that Indiana and Michigan also take this first step toward regulating these essentially point-sources of agricultural pollution.

Basic to the solving of the entire problem of pollution from land-use activities is control of soil erosion. Soil particles carry phosphates and pesticides from the land to the waterways; animal wastes are also transported to the lakes and streams by the same erosion mechanisms; and vast quantities of soil are lost from the land by improperly managed urban and suburban land development operations. Proper application of soil and water conservation techniques would abate these pollution sources. None of the Lake Michigan States now has a workable program to halt this form of pollution. Ideas for proposed legislation are being considered in Indiana for sediment control on all lands, rural and urban, and a state-wide sediment control conference was recently held in Michigan to exchange information and suggestions in that State. But unless legislative measures are adopted, control of pollution from industrial and municipal point sources will have only limited effect on overall water quality improvement. It is suggested that mandatory sediment control policies be promulgated by cooperating officials from soil conservation districts, county governments, and municipal and State agencies.

In conjunction with such action, zoning boards should be instructed to adopt regulations prohibiting waste-producing agricultural operations from unprotected land of high slope in the proximity of waterways, from fertilizer and pesticide application in flood plains, and prohibiting urban land developers from construction in erosion prone areas and flood plains.

Another zoning requirement should be the establishment of permanent "green belt" areas surrounding urban communities. Such permanently set aside parkland or other recreational reservations would serve to separate odor and dust producing agricultural operations such as concentrations of livestock, manure spreading operations, and plowing and harvesting actitivies. Indeed, physical separation of urban and rural areas would serve to minimize many irritations occurring along the fringe of rapidly expanding communities.

It is recognized, despite the evidence indicating the significant effect of agriculture and other land-use activities on the lowering of water quality, that there may be areas of concern in which there are insufficient data to support the suggested need for legislation or other action programs. To assemble such information, it is therefore recommended that a Task Force be established, with the aim of gathering adequate facts to form the basis of recommendations to a reconvened session of this Lake Michigan Enforcement Conference.

In summary then, it is suggested that work proceed leading to the ultimate adoption of the following measures to abate pollution from agricultural and other land-use activities:

1. Uniform regulation of pesticide use including licensing of applicators, use permits, and accounting procedures to record all purchases and applications.
2. Animal waste regulations to prevent transport of manures to surface and ground waters; they should include guidelines for approved disposal of the waste material by techniques of irrigation, lagooning, and land spreading.
3. Mandatory soil erosion control measures to include both rural and urban areas.
4. Modifications in zoning codes to prohibit waste producing activities from erosion susceptible land and to create a "buffer zone" between expanding urban communities and agricultural land.

Wisconsin Ecological Society
P.O. Box 514
Green Bay, Wis. 54305

Dr. Douglas LaFollette
Wisconsin Ecological Society
1004 College Avenue
Racine, Wisconsin 53403

March 23, 1971
FOR IMMEDIATE RELEASE

"Dangerous and often illegal levels of DDT and Dieldrin in Lake Michigan trout, salmon, chubs, and other fishes raise a number of important questions, which no one seems willing to answer," challenged Douglas LaFollette, speaking as a Board Member of the Wisconsin Ecological Society. "We have waited for some word from the Department of Natural Resources, since the conference on commercial fishing held in Green Bay on January 23, 1971." He said that they felt the citizens of Wisconsin should be told the facts and allowed to have the honest reasons behind the silence about the very high pesticides levels in both commercial and sport fish.

The Wisconsin Ecological Society feels that there are "strong indications that failure to publicize these dangerous levels of DDT is but another example of the built-in conflict of interest which plagues the DNR."

The same State agency which is charged with preserving Wisconsin's resources and protecting it's citizen's health from pollution is also concerned with selling fishing licenses, stocking streams with fish, and developing and encouraging the growth of sport fishing and the tourist trade.

LaFollette, a Professor of Chemistry, cited a recent survey by Ronald Poff and Paul Degurse of pesticide residues in Great Lake Fish which showed that "most trout and salmon from Lake Michigan exhibited DDT residue levels in excess of 5.0 ppm, the established limit of the Food and Drug Administration". (Management Report No. 34,M '70)

He added that, although the study was done by the Bureau of Fish Management of the Department of Natural Resources, the Division of Environmental Protection must certainly be aware of the results. "Some of the fish samples were in excess of 14.0

ppm DDT and over 0.3 ppm Dieldrin and many ranged from 5 to 11 ppm DDT and from 0.2 to 0.3 ppm Dieldrin." The FDA has concluded that 0.3 parts per million of Dieldrin in the edible portions of fish warrants legal action.

These facts raise the question of whether the Department of Health, Department of Agriculture or DNR itself should prevent people from eating contaminated fish. LaFollette pointed out that because of the high cost of sport fishing (as much as $20 per day) it is likely that sport fishing is predicated on sport and trophy rather than food. "however," he added, "the State agency is still responsible for widely publicizing these dangerous pesticide levels. It is appalling that the DNR could ignore the implications of their own report for so long."

In the area of commercial fishing the DNR seems equally able to ignore the fact that a very large part of the Lake Michigan fish catch exceeds FDA health limits. LaFollette said that, according to a paper presented by Don Winter and Lloyd Lueschow of DNR at the AAAS meeting in Chicago on December 29, 1970, "approximately 80 percent of the Lake Michigan commercial catch is nonmarketable in interstate commerce."

Here again we think a conflict of responsibility is possible. The DNR, which regulated commercial fishing makes no mention of these pesticide levels when talking about commercial fishing. They discuss low fish populations due to lamprey eels and say "lake trout populations have not built up to the point where it would sustain commercial harvest." (Quote from Russell I. Daly, DNR Lake Michigan coordinator at the January 23, 1970 conference in Green Bay.)

Fishermen want an end to restrictions on net fishing, to be paid 30 cent per pound for lake trout, and for an increase of trout planting in the lake. They say this will stimulate the economy of Wisconsin and keep commercial fishing alive. LaFollette stressed that trout had the highest DDT levels of any fish, according to DNR'S own Report No. 34.

"The question is; why DNR does not forcefully make these points to the commercial fishermen and to the public?" The Wisconsin Ecological Society does not believe that fish unfit for interstate sale should be sold in Wisconsin or that tax dollars should be used to promote commercial or sport industry when the dangers of DDT and other pesticides are well established.

UNITED STATES OF AMERICA
ENVIRONMENTAL PROTECTION AGENCY
REGION V
WATER QUALITY OFFICE
33 EAST CONGRESS PARKWAY ROOM 410
CHICAGO, ILLINOIS 60605

March 29, 1971

Mrs. Kathleen Nixon, Secretary
Mason County Anti Pollution Action Council
P.O. Box 674
Ludington, Michigan 49431

Dear Mrs. Nixon:

I am sorry that you were unable to attend the recent Lake Michigan Enforcement Conference held here in Chicago on March 23-25, 1971. Your statement was received in time for presentation and Mrs. Lee Botts of the Open Lands Project, read it to the Conferees the first afternoon.

The Michigan Conferee reported to the conferees on progress they are making in abating point source discharges of chlorides to Lake Michigan Basin Office. The conferees expressed their desire that Michigan continue their program to bring these dischargers under control at the earliest possible date.

The conferees will shortly be preparing detailed reports on the status of compliance with measures underway to abate the discharge of pollutants to Lake Michigan. It is expected that the Conference will be reconvening in about two months to consider these reports. At the request of the Michigan Conferee, this next meeting will be within the Michigan portion of the Lake Michigan watershed.

Again, thank you for your concern in abating the discharge of pollutants and in preserving Lake Michigan's high water quality.

Sincerely yours,

Glenn Pratt
Glenn D. Pratt

P.S. Your presentation will appear in the transcript as read, but I am returning your original to you for any further use you may have for it.

Attachment: Transcript

Copies to: R. Purdy ✓**M. Stein**
L. Townsend

Statement of the

MASON COUNTY ANTI POLLUTIon ACTION COUNCIL (MACAPAC)

REGARDING THE

CHLORIDE CONTAMINATION OF

LAKE MICHIGAN AND RECOMMENDATIONS

Presented to:

LAKE MICHIGAN ENFORCEMENT CONFERENCE

March 23-4, 1971

Sherman House

Chicago, Illinois

This report is similar in content to one which we attempted to present in a public meeting held by the Michigan Water Resources Commission in Manistee, January 21, 1971.

Our organization, the Mason County Anti Pollution Action Council, known as MACAPAC, was formed in September of last year to study and act upon the pollution problems of our area. We now have information on a number of different pollution problems there.

We will limit ourselves in this paper to only one problem. That is, chloride discharges into Lake Michigan from a pipeline between Ludington and Manistee. In our paper we will draw from data from the Water Resources Commission Industrial Wastewater Survey Reports and from the minutes of the Michigan Water Resources Commission meeting of January 21, 1971. We will use these data because they are the most reliable and authoritative we have.

The Industrial Wastewater Survey Report is that of the Dow Chemical Company of Ludington, Michigan for November 3-5 of 1969. This report is approximately 16 months old at this time.

Dow Chemical Company processes brine, It discharges effluent containing concentrations of chloride into Pere Marquette River. In addition, Dow discharges effluent containing high concentrations of chlorides into Lake Michigan by way of a 14 inch diameter pipeline which runs from the plant in Ludington to a point approximately 9,000 feet north of Point Sable and 500 feet from shore in about 15 feet of water. This pipeline has been in existence since 1943. In the meeting of January 21, 1971 the WRC admitted that 5 point sources supply at least one half of all chlorides into Lake Michigan. Three are in Manistee and two in Ludington. The two in Ludington were named as The Dow Chemical Company and the Harbison-Walker Company.

We would like to draw your attention to some figures for the discharge of this pipeline. For the first survey period from the third to the fourth of November, the total solids discharged were 3,190,000 lbs/day. The total chlorides discharged was 1,693,000 lbs/day. The concentration of chlorides was 145,000 mg/1. For the second survey period, from the fourth to the fifth of November, the total solids discharged were 1,448,000 lbs/day. The total chlorides discharged was 794,000 lbs/day. The concentration of chlorides was 68,000 mg/1. We understand that Dow is participating in a voluntary program to restrict and control the polluting content of their waste discharges. We have requested information on the subject from Dow but have not yet received any.

Note that we are talking about millions of pounds of chlorides and concentrations in the thousands of parts per million. The quantities of discharge over a long period of time have amounted to astronomic proportions. The concentrations of chlorides as they come from the pipe are vastly greater than any acceptable standard which we know of.

We understand that the discharge of these heavy concentrations of chlorides have been permitted with the concept that there is a mixing zone where these chlorides are mixed and diluted with the fresh waters of Lake Michigan. We submit that, in practice, the definition of a mixing zone is that quantity of water required to dilute an unacceptable effluent to an acceptable level. By this logic it might be reasoned that no discharge would be unacceptable until the entire lake failed to meet the standards for discharge waters.

We also understand that, at present, one must prove injury before action can be taken to abate a particular pollution problem. In practice, injury has been interpreted to mean obituary and regulation impossible till the damage is done.

The primary fault is not with Dow. Dow has 400 employees in Ludington. The community depends on their presence. It would be pointless to act against Dow and not against other firms which may do the same thing, perhaps in other states. What Dow has done is neither illegal nor unreasonable under the circumstances. The fault is in the circumstances.

What is needed is (1) regulation of industrial waste discharges with uniform standards based on ecologic principles; (2) that the regulations be enforceable; (3) that there be sufficient personnel and funds to enforce them; and (4) that there be additional technical and scientific personnel and funds to find solutions, if possible, for problems for which there are presently no solutions.

We are concerned about the pollution problems of our lake and elsewhere. Our ability to effect these problems is limited. Representatives here have the power to effect these problems if they will act. The primary fault is, therefore, inaction.

EM•

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WILLIAM RUCKELSHOUSE
ENVIRONMENTAL PROTECTION AGENCY
1129 20TH ST NORTHWEST WASHDC

POLLUTION IN LAKE MICHIGAN CRITICAL. THERMAL DISCHARGE STANDARD NECESSARY TO AVERT STOP FURTHER DEGRADATION

JACK R MUNSEE 34 SOUTH FAWN.

836A EST.

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